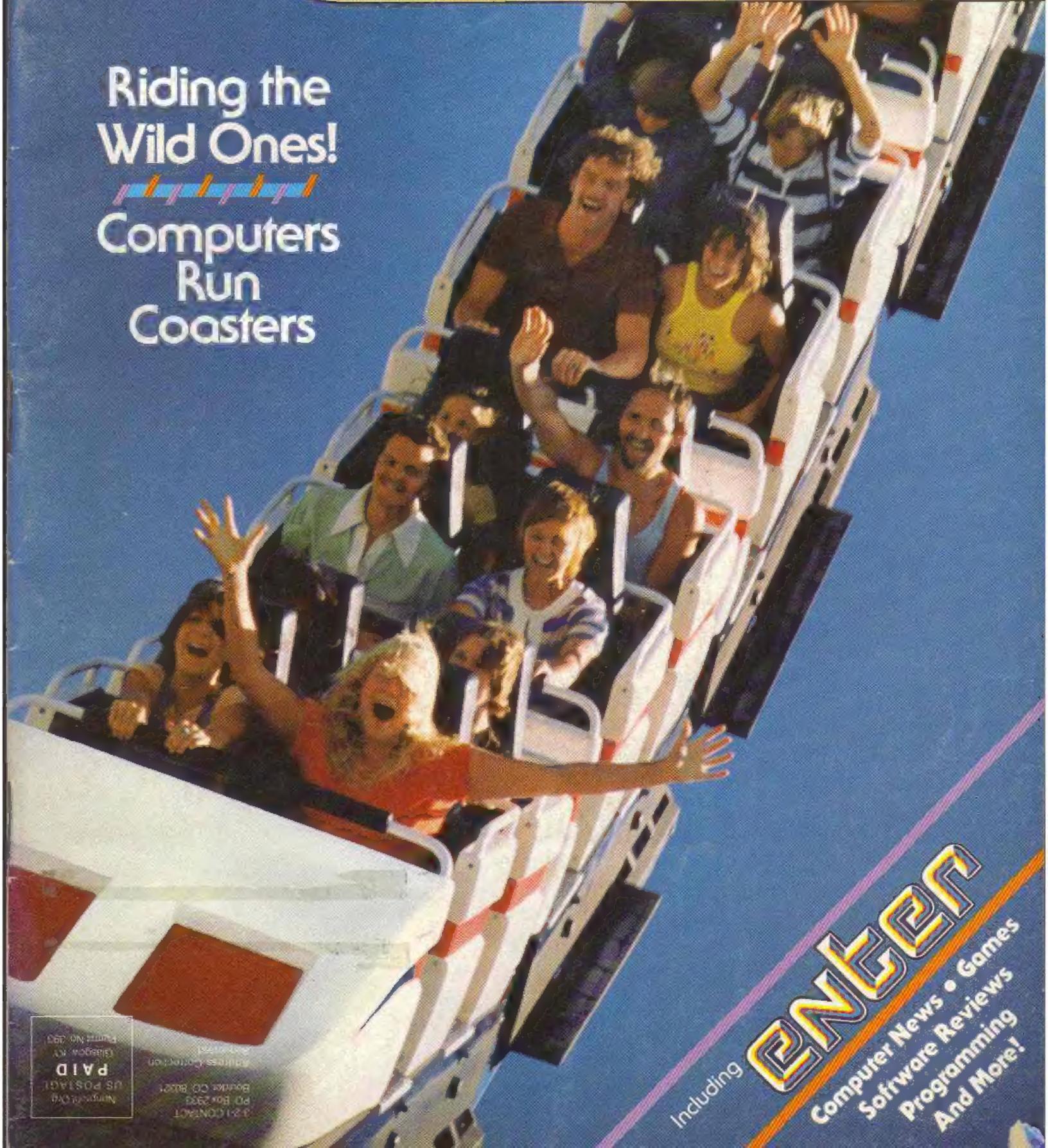


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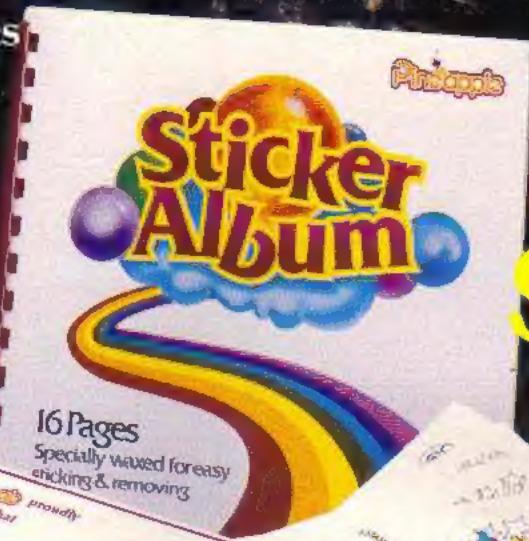
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Cover Photo

© Christopher Springman/The Stock Market

# Coming Attractions



ILLUSTRATION © PAT CUMMINGS

## Super Tube

You've probably heard of drive-in movies, but how about drive-in TVs? Visitors to the future-looking world's fair in Japan, can get to see a giant 80-foot by 150-foot TV screen.

The set is called JumboTRON, and it is 100 times larger than an average 20-inch set. Sony, the company that made the giant screen, says you can see the picture most clearly from a distance of 55 to 550 yards. But it can be seen from half a mile away.

The screen has 150,000 small cells. Each of these holds three colored picture elements, or pixels. Pixels are the red, blue and green lights that blend to make any color. The more pixels, the sharper and clearer the image.

The giant set was put together in pieces. Each is about the size of a garage door and six feet thick. Thirty-six of these 2,000 pound pieces will make up one screen.

Sony predicts that JumboTRON will be used for advertising billboards or huge highway signs to report accidents and road conditions.

## Now Read This!

In the future, written messages may appear on your wrist. They may tell you to phone home. Or they may remind you to pick up your pet at the vet. Or they may flash signs telling you to pick up a quart of milk for dinner.

If these wrist-written messages sound like magic, they aren't. They are received by a handy-dandy invention about the size of a deck of cards.

The message-sender types a message into a computer keyboard. Sound waves zip the message along until it is picked up by a special antenna.

From there the message travels to the machine on your wrist. At the sound of a beep, you can read the message on a tiny screen: "Hurry home. Your dinner's getting cold." Or even better, "No school today!"

Right now the TV-like machine costs a pricey \$400. But the company that makes it says the cost may come down in the future.



ILLUSTRATION © BRAD HAMANN

## Video Vendors

People in Phoenix, Arizona, are lining up on street corners to try out a new machine. It's a video vending machine.

The machine automatically rents videotapes of movies to people who own VCRs. Each vending machine stores 168 tapes.

By the end of 1985, the company who makes and stocks the machines predicts that there will be as many as 6,000 machines.



PHOTO COURTESY OF SONY

## Eye See You

Typing without any hands and speaking without a voice? It can be done!

People who are paralyzed so that they can't move any parts of their bodies are now learning to type! They do this by wearing a new pair of special goggles.

With the goggles, the wearer sees a line-up of typewriter keys. As he focuses on a particular letter, a beam of light and a sensor can tell which letter he is looking at. A small computer helps to type that letter.

But scientists haven't stopped there. They are also working on a system to turn typed words into an artificial voice so that disabled people who can't speak can "say" what they've written.

## Where's the Beef?

"Oh boy! Myco-Protein for dinner!" If scientists are successful, one of these days you might be saying just that!

Myco-Protein is a kind of fungus. It is also a food product that's being developed in England. It may soon be used as an ingredient in foods ranging from chocolate cookies to chicken-flavored snacks.

Myco-Protein has a lot going for it. It has plenty of protein and not much fat. It's also a good source of fiber. That's something that doctors say is necessary for good health.

What does it taste like? If myco-protein is added to food, you'll never know it's there! Mmm-mmm good!

## The Living End

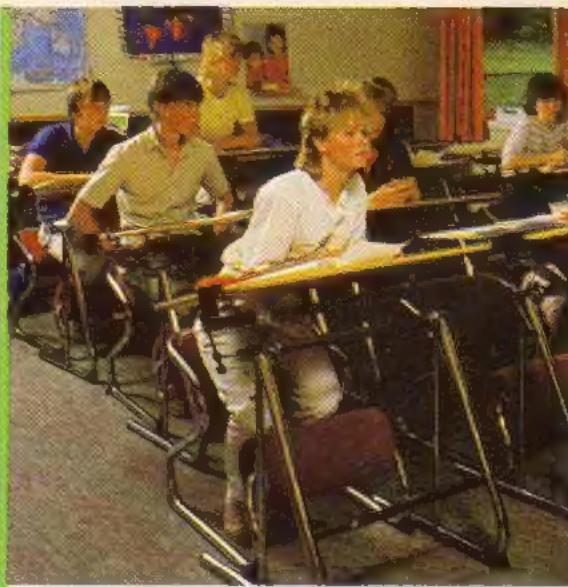
Two teams of scientists working with a computer company have come up with an amazing theory. They say that somewhere beyond the solar system is a star that can wipe out most life on earth.

The scientists say that the "killer" star orbits the sun once every 26 million years. At one point it passes close enough to the sun to send some comets falling into the inner solar system. About 25 of these comets hit earth. When the comets hit, they darken the sky with dust that kills plant and animal life.

The researchers think this may be the reason why dinosaurs disappeared off the face of our planet some 65 million years ago. The scientists think that this has happened more than once—and will happen again.

But don't get upset. The last collision happened 12 million years ago. So it will be another 14 million years before the star returns. So go ahead and make plans for next week.

PHOTO COURTESY OF HAG USA INC.



## Chair Enjoyment

More and more people are sitting on their knees—on a new kind of chair. The chair doesn't have a back. Instead you sit on a stool-like seat and rest your knees on a pad.

The new chair was designed with the help of doctors who treat people with posture and back problems. Doctors say that in the chair, people sit up straight and suffer less from back pain.

The chairs are good for people who sit all day at desks. So maybe before long you'll be sitting on this new type of seat right in your classroom!

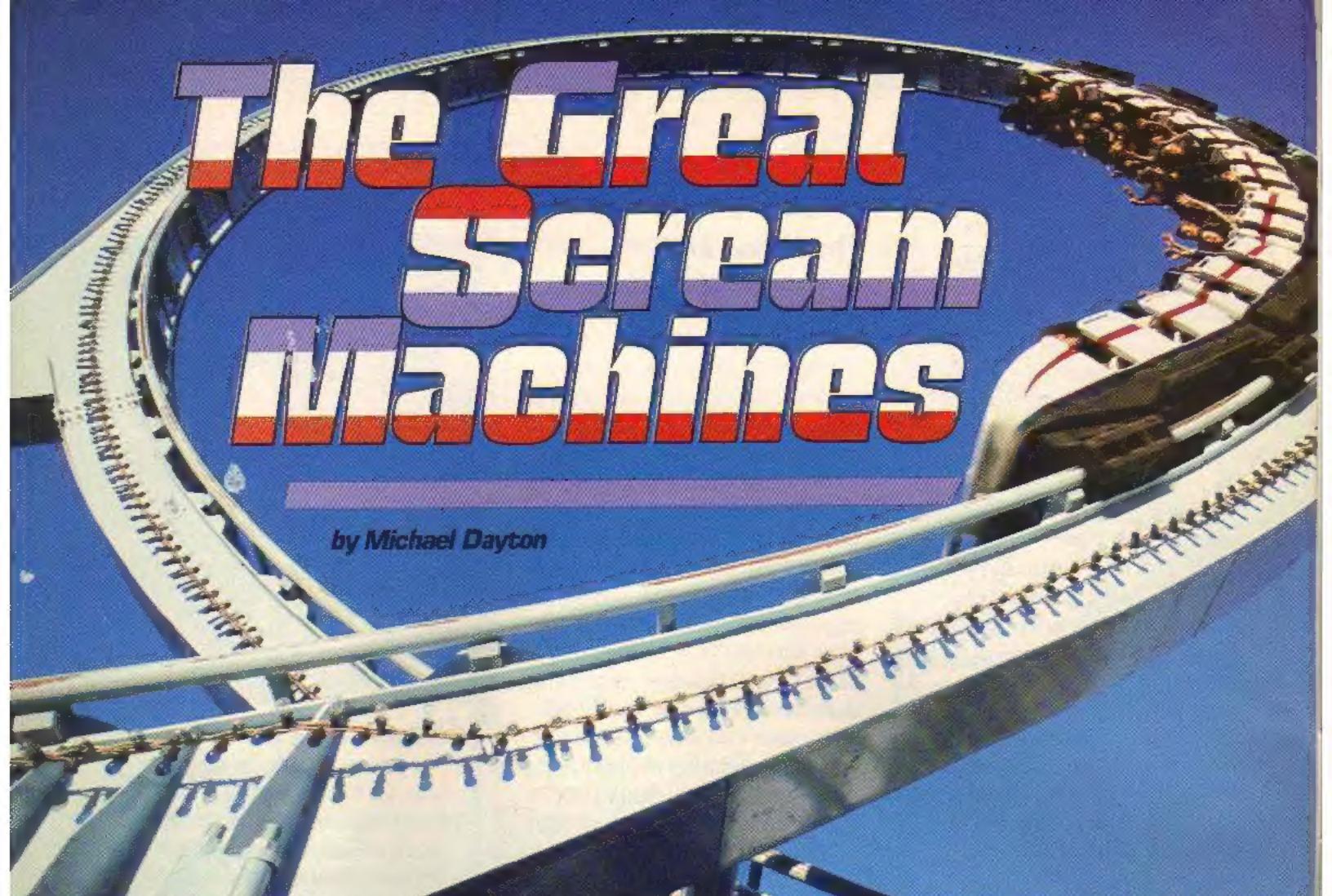
## So What's New

You tell us and you'll get a nifty CONTACT T-shirt—if we print your story. Send us any science stories that have to do with the future (which could even be next week!) Send stories to:

Coming Attractions  
P.O. Box 599  
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ILLUSTRATION © RON LIPKIN





# The Great Scream Machines

by Michael Dayton

## COMPUTERS BRING NEW THRILLS TO ROLLER COASTERS

The passengers scream as the train hurtles through corkscrew loops at 50 miles an hour. The train tops a small hill, then drops 70 feet in a stomach-turning fall. It roars through a German village, passing inches away from a row of houses. The passengers scream louder. Are they on a runaway train?

No, they're having a great time! They're aboard the Big Bad Wolf, a roller coaster at Busch Gardens in Williamsburg, Virginia. Like many of today's amusement park rides, the Big Bad Wolf was designed and is run by a computer.

This summer, thousands of thrill seekers are flocking to amusement parks. They're spinning, diving, or somersaulting on "death-defying" machines named The Tidal Wave, The Screamin' Demon or The Great American Scream Machine. But the one machine people are almost certain not to see is a computer!

Yet computers are there in amusement parks,

all right. They are behind the scenes like some high-tech Wizard of Oz. They're the magic behind the magic of the rides.

Why are computers not seen? "Park owners want to create a fantasy world that has little to do with life outside the park," says one amusement park official. "In most cases, computers would spoil that fantasy. So the use of computers is disguised."

### Who's Afraid of the Big, Bad Wolf?

The favorite ride at any amusement park is still the roller coaster. Today, there are 200 roller coasters in the U.S.—some dating back to the early 1900's.

Now, thanks to computers, a new generation of roller coaster rides is being born. The Big Bad Wolf is one of this new breed. It was designed with the help of computers, and is now monitored by its own computer system.

The design of the Big Bad Wolf is different



PHOTO: ALPHA/© ZIMMERMAN



PHOTO: © BRUCE COLEMAN INC.

**Above:** Thrills and chills come fast and furious as coasters zoom along at speeds up to 66 miles an hour.

**Below:** Hang on! Thanks to gravity, seatbelts and computers, coasters are safer than ever.



PHOTO: SIGMA/© 1978 TOM ZIMMERMANN

from most coasters. According to Mel Bilbo, Busch Gardens' director, the Wolf's cars hang from an overhead rail. They reach speeds of 45 miles an hour as they swing and sway only a few feet above the ground. Because the train is suspended from above, it swings out to the side through each turn.

The Big Bad Wolf is the newest ride built by a company called Aero Huss. Ron Toomer, an engineer who works at Aero Huss, helped design 50 of the world's most popular coasters.

"It's gotten easy to design a roller coaster," Mr. Toomer told CONTACT. "Once you have a design, the rest is simple, thanks to a computer. One of the few things computers can't do is ride the coaster."

The first step in building a coaster is to consider the layout of the amusement park where the coaster will be built. For the Big Bad Wolf, Mr. Toomer studied the land and drew up a rough plan. Next he put the computer to work. "We have a machine that mapped out the entire course," he said. "It showed us the best way to use the land from one hill down to a lake."

The designer used the computer to figure the height, length, and braking needed for this roller coaster course. The computer also helped to decide how sharp the curves should be.

"The computer even told us how far the cars would swing out on the curves," Mr. Toomer said. "Using that information, we knew where to put nearby buildings so the train could safely ➤



**Right:** Kids get a look at the Hewlett Packard computer that engineers use to design coasters.

**Below:** This Loch Ness Monster is a coaster that lives on land!



swing as near as possible to the buildings." That adds to riders' thrills and chills without making the coaster dangerous.

### Gravity: A Real Downer

Computers are a big help but most of today's rides still operate on a simple scientific principle: gravity. Gravity is the force that pulls objects—and people—back to Earth when they're up in the air.

"In most rides, the trick is to keep track of falling objects," Mr. Toomer says. "In this case, the object is a coaster train. The computer tells us where it is at any moment."

On a roller coaster, the first hill must be high enough to give the train enough speed when it comes down on the other side. Otherwise, it won't be able to complete the loop. "Using our computer, we could predict how high each section of the ride had to be for the train to go all the way around," explains Ron Toomer.

The use of a computer to design a ride is only half the story. After a ride is built, the park's main computer runs it safely.

"On the Big Bad Wolf, 70 to 80 computer sensors keep track of each of three separate trains," Mr. Bilbo says. The sensors are small electrical devices that feed information back to the computer. "With the aid of computers, we know where each of the three trains is located at any moment. We know what the air pressure of the

brakes is, and the speed of each train throughout the run."

The entire ride is divided by the computer into five blocks or sections. The computer keeps track of each train's location. "If two trains were to enter the same section, the computer would automatically shut the entire ride down," notes Mr. Bilbo.

The computer even comes in handy when making repairs. "Each train has 140 wheels. If one wheel goes bad, sensors alert the computer," Mr. Bilbo says. "Then the repair crews are alerted."

### Can a Ride Be Too Safe?

The result of all this computerization is a roller coaster ride that is fast and thrilling yet

smooth and safe.

What can you expect computers to do next at amusement parks? "We may soon have upside-down roller coasters. They will require a great degree of computer design and control to keep them safe," predicts Mr. Toomer.

Almost everyone is happy about all the improvements. But a few roller coaster fans think today's computerized rides are too safe.

"Some of those old rides were really unsafe—there was nothing to keep the car from jumping the track," Mr. Toomer says. "But to some people, that was part of their appeal."

With the exception of these few "coaster nuts," however, most fans think that computers are the greatest machines to hit the amusement parks since the roller coaster was first invented.



At Disney World, kids can design their very own roller coaster. Building it is another matter.

### Coaster Facts

**The first:** The modern roller coaster was invented by LaMarcus Thompson. The first passengers took a ride in 1884.

**The oldest (in use):** "Leap The Dip," a wooden roller coaster in Altoona, PA, has been coasting along since 1902.

**The fastest:** The American Eagle at Marriott's Great America amusement park in Gurnee, IL, can reach a speed of 66.31 miles per hour.

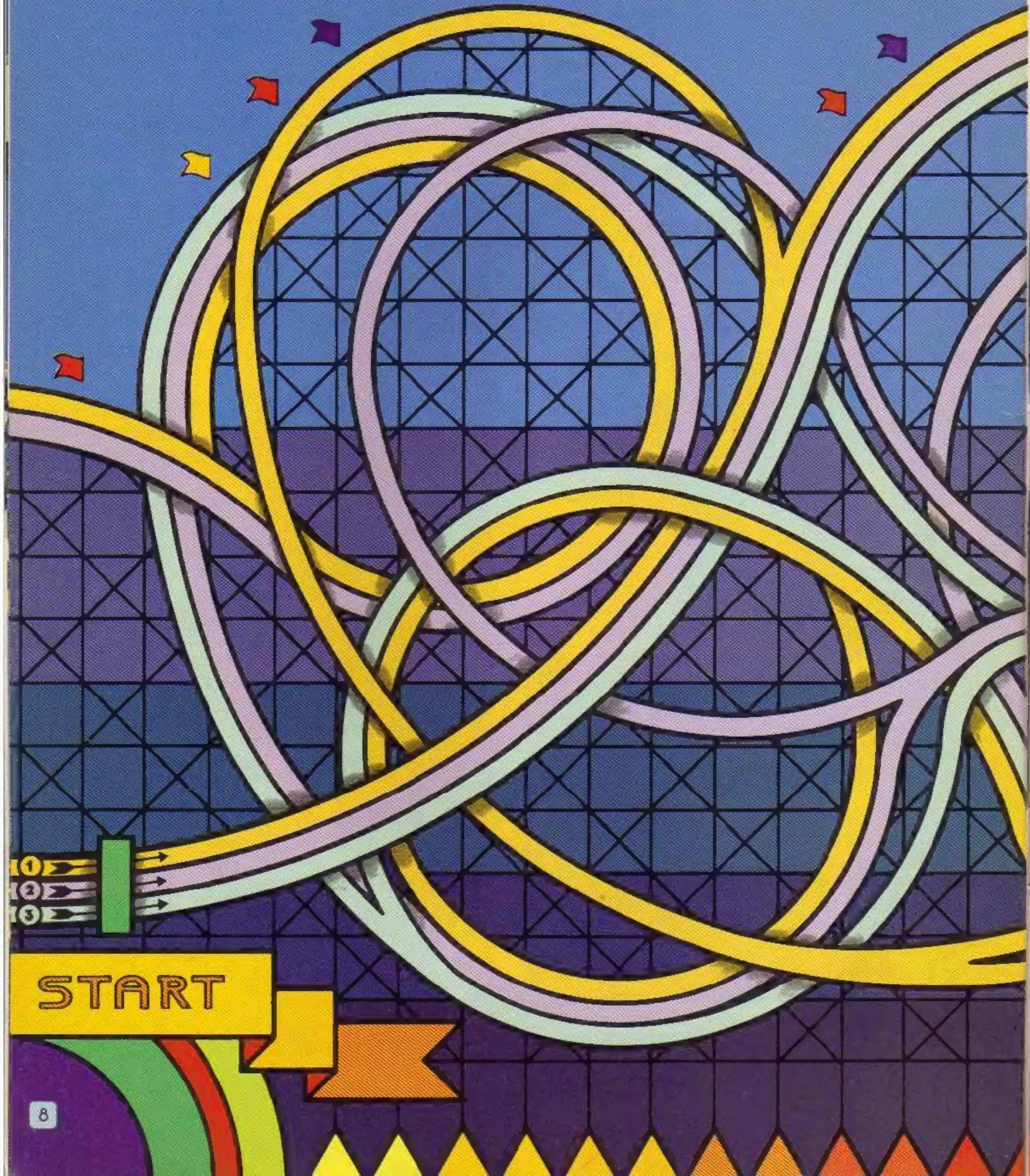
**The highest:** Look out below! A coaster as high as a 19-story building? You betcha! The 193-footer is in Japan.

**The longest:** The Beast at King's Island, near Cincinnati, OH, is 7,400 feet long.

**The best:** According to roller coaster fans, any list of the best should include the Texas Cyclone at Astroworld in Houston, TX, Mister Twister at Elitch Gardens in Denver, CO, and the Cyclone at Coney Island, NY.

**Let the good times roll:** Do you love riding roller coasters? Then you might want to be part of American Coaster Enthusiasts, a national roller coaster fan club. For information about joining, write to: American Coaster Enthusiasts, Post Office Box 8226, Chicago, IL 60680.

# Contact Comet

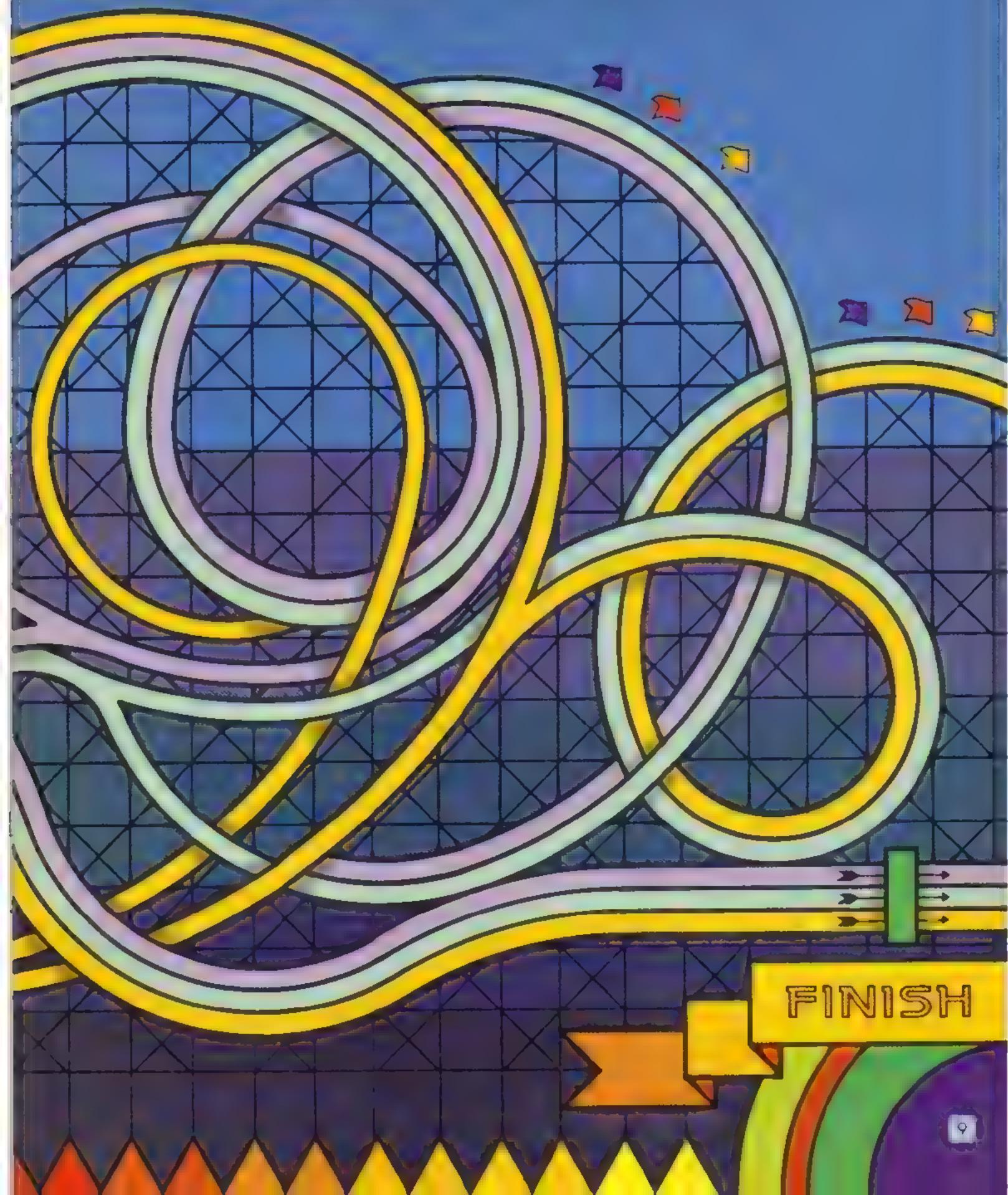


# A Roller Coaster Maze

Warning! This maze is tricky! Only one path will lead you safely to finish. Begin at the numbers 1, 2, and 3. The tracks pass under each other as if

you were traveling under a bridge. For example, you can follow the blue track as it passes under the yellow. Stay on one colored path at a time, as you try to find your way to finish.

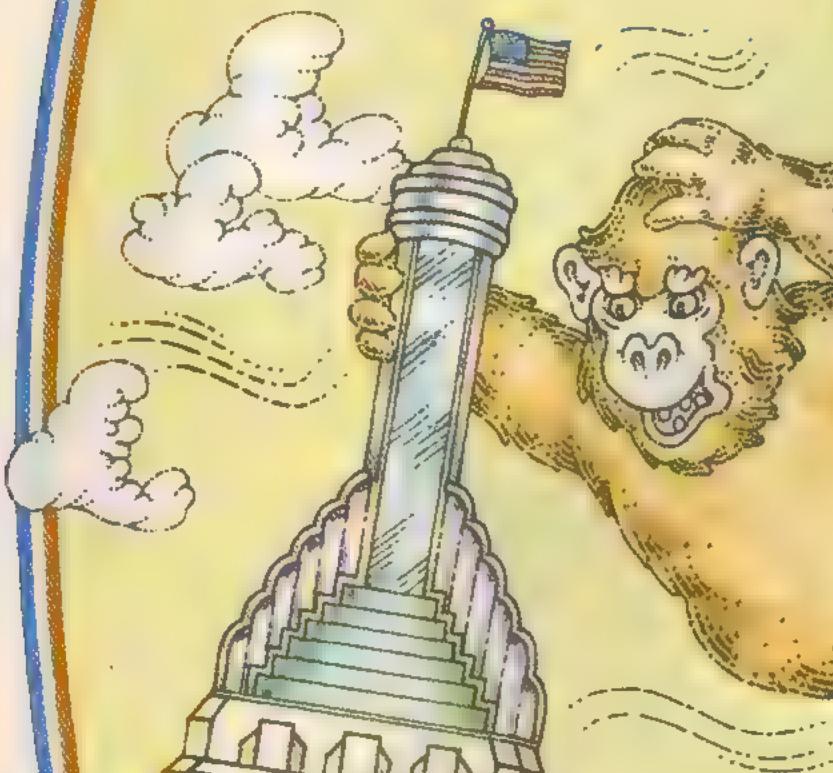
**Answer on the Did It! page.**



# Factoids



Over 70 percent of the earth is covered with water.



Skyscrapers are built to sway as much as three feet in strong winds. If not, they would break.

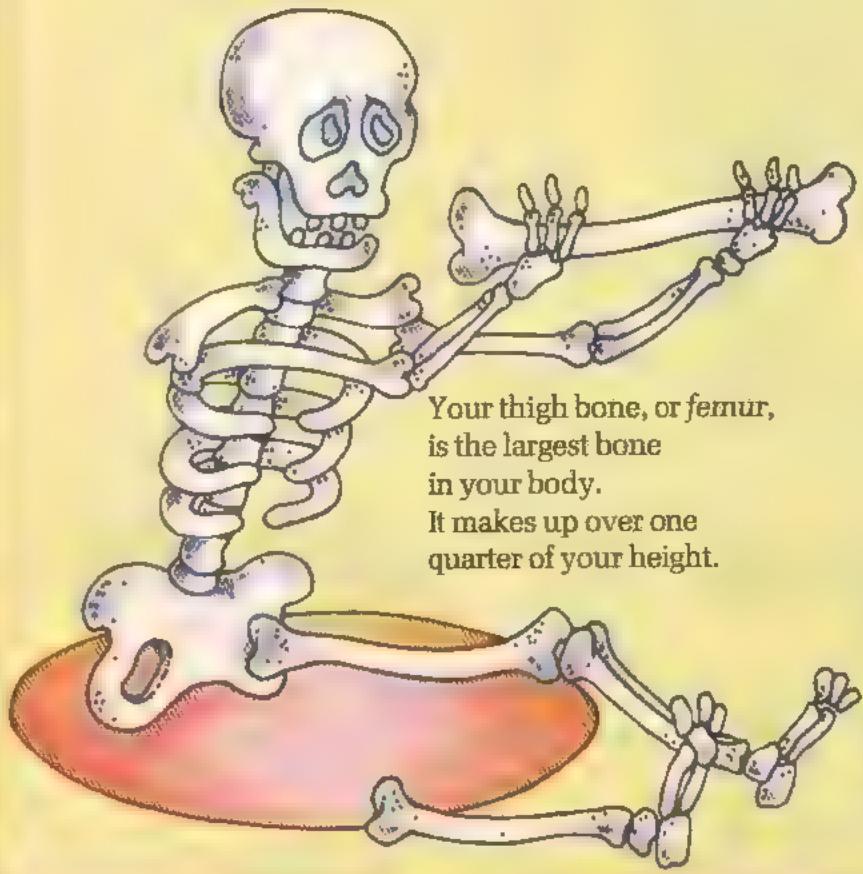
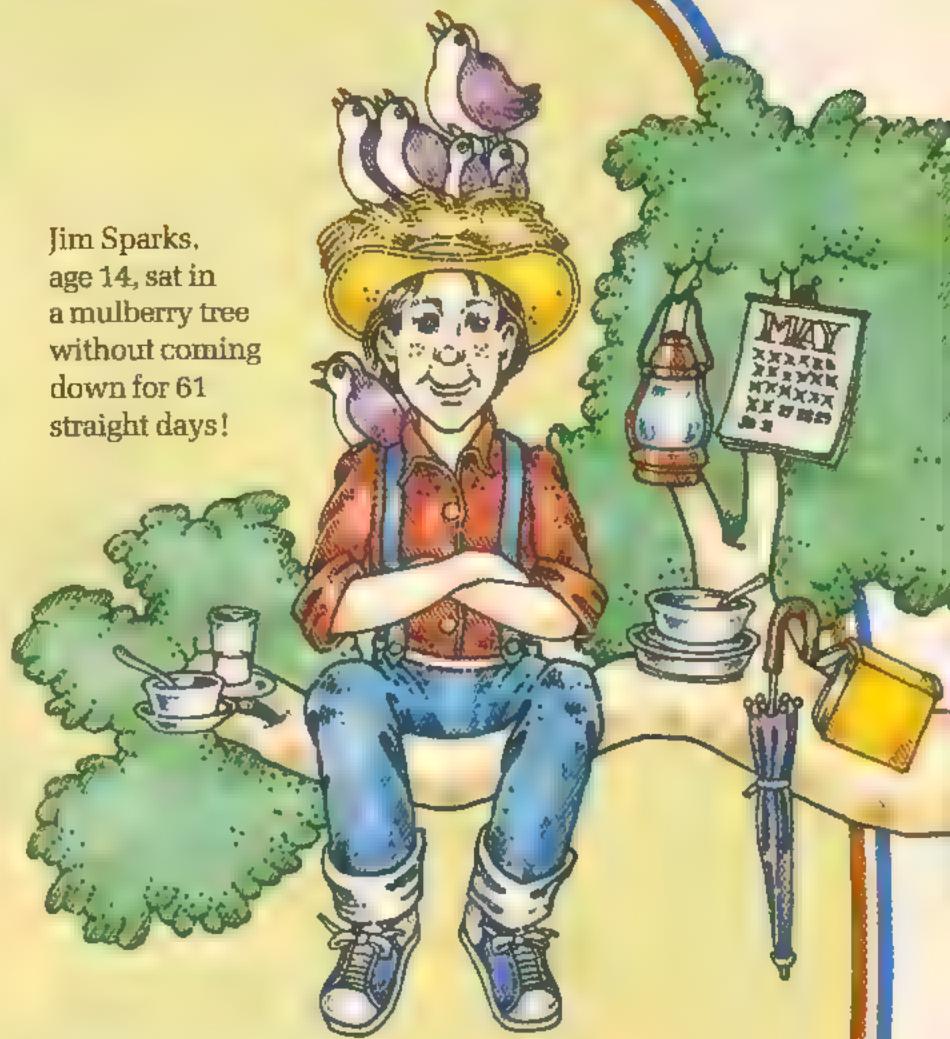


Gum, soap and fireworks are all made from trees.



In sunlight, a toucan's  
bill glows like a  
stained glass window.

Jim Sparks,  
age 14, sat in  
a mulberry tree  
without coming  
down for 61  
straight days!



Your thigh bone, or femur,  
is the largest bone  
in your body.  
It makes up over one  
quarter of your height.

A wingless mosquito is the largest  
land animal on all of  
Antarctica.





# Any Questions?

by Madeline L. Boskey

## How does a lie detector

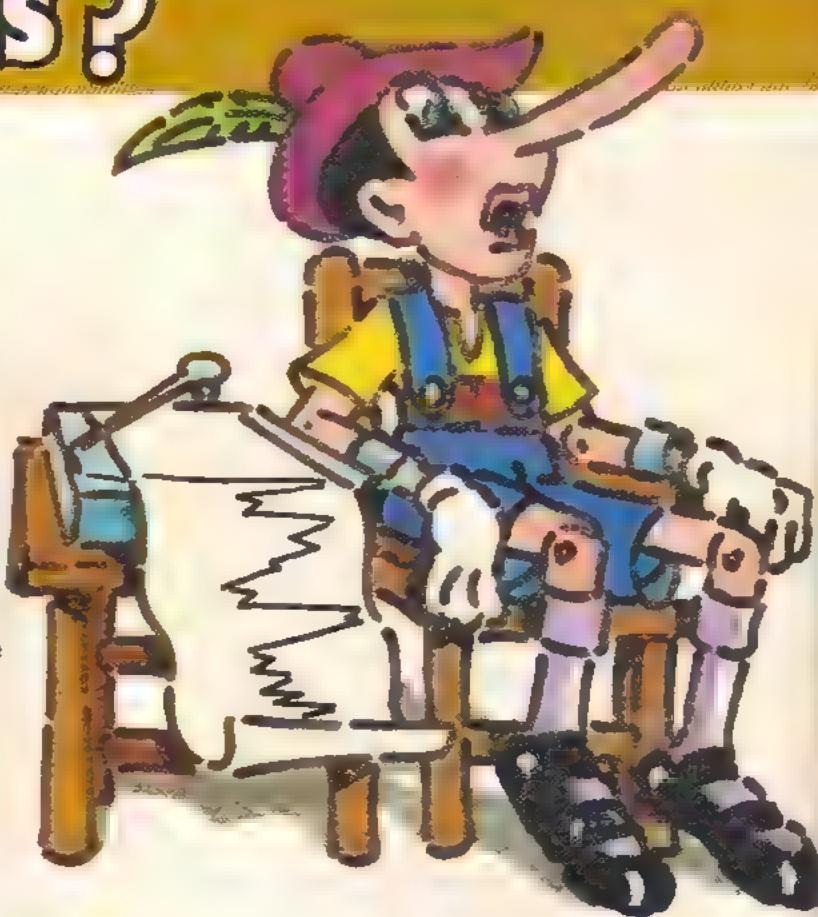
**work?** Can a machine show if you are telling a lie? Possibly, if it's the polygraph.

When people tell a lie they often get upset. That can cause body changes. Their heart might beat faster. Their blood pressure might go up. The lie detector can pick up these changes.

To detect changes, wires from the lie detector are attached to a person's body. Then the person is asked questions. The lie detector measures changes in heartbeat or breathing as he or she answers. Big changes often mean big lies!

But lie detectors aren't foolproof. Some people can control their emotions well. Telling a lie might not cause a great change in heart rate or blood pressure for some people. But that is unusual. So, many people still think that a lie detector can tell if your body is shouting "No" while your voice is saying "Yes."

Question sent in by Sarah Nolan, Vancouver, WA.



## Why can't you feel the earth turning?

Hold on to your hat! The earth is whirling around at about 1,000 miles per hour. At that rate, you might think you'd have to grab on to the nearest tree! But you're not blowin' in the wind—and neither is anything else around you. Why? Because you are on the earth and traveling with it. Since you share the earth's movement, you can't feel it.

You can see how it works by imagining a ride on an airplane. You might be zooming along at nearly 600 miles per hour. But if you sit in your seat, or even walk up and down the aisle, you aren't aware of the movement. You only notice it if you look outside at the clouds or ground going by. Or if the plane suddenly changes speed.

It's the same kind of thing on earth. Since everything on earth is moving with you, you can't notice anything moving. But if the earth were to suddenly speed up, slow down, stop or change direction—you sure would notice it!

Question sent in by Robin Chittick, Northford, CT.

Do you have a question that no one seems able to answer? Why not ask us? Send your question, along with your name, address, and age, to:

Any Questions?  
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## Why were people shorter long ago than they are today?

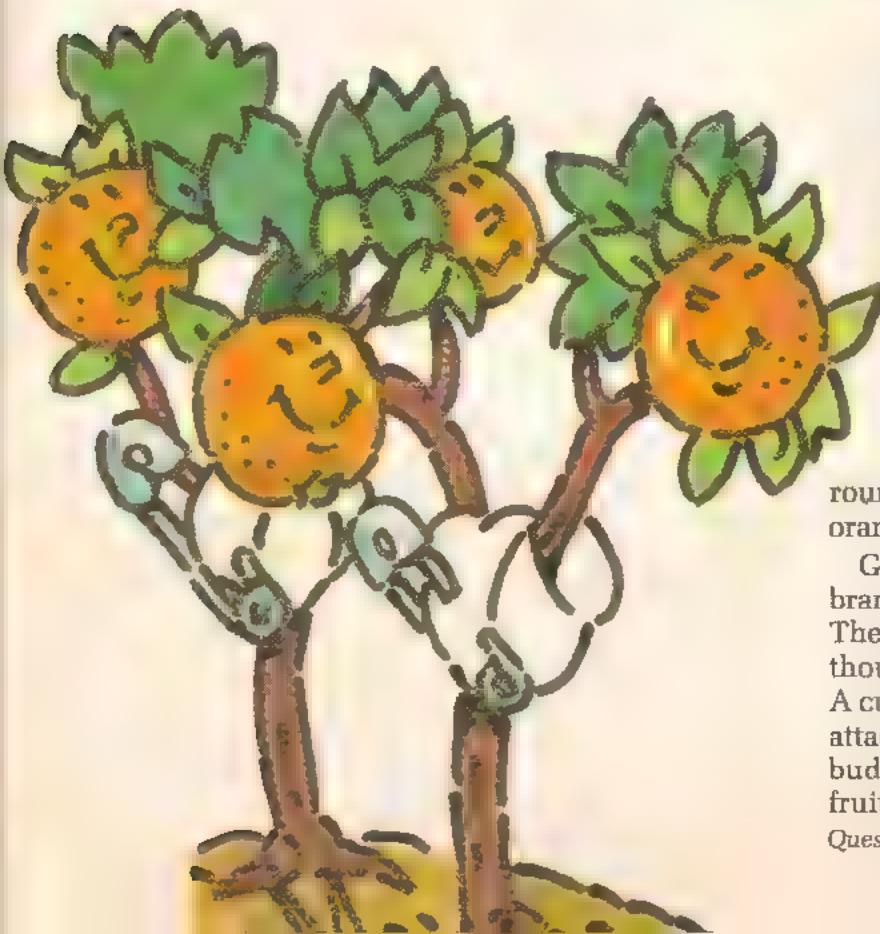
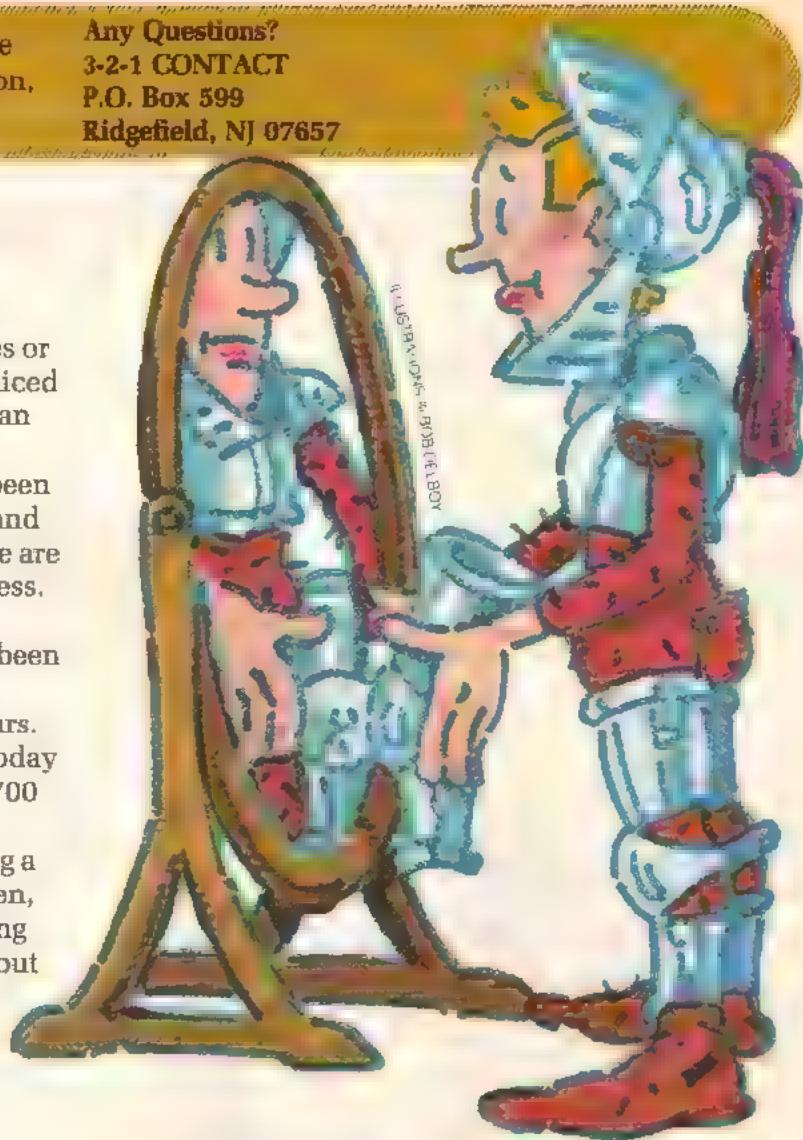
Have you ever seen old costumes or armor at a museum? If so, you may have noticed that people of long ago were a lot smaller than the people of today.

How come? Over the years, people have been getting better care. People are eating better and more healthful foods. Advances in medicine are keeping people healthy and preventing illness. Exercises keep people fitter.

With all this improved care, people have been growing bigger and healthier. The changes occurred little by little over hundreds of years. But the result is that the average person of today is taller than the average person who lived 700 years ago.

Luckily though, there are limits to how big a person can grow. So if you ever have children, you won't have to worry about them towering 10 feet over you when you ask them to take out the garbage!

Question sent in by Jason Cochran, Baltimore, MD.



## How do we get new navel oranges if they don't have seeds?

What do you need to grow a new plant? Seeds, right? Well, most of the time, but not always. Fruit farmers have found a different way to grow new fruit.

When orange trees are grown from seeds, their fruit doesn't always turn out the same each time. Orange farmers want to be sure that every piece of fruit they grow is as round, sweet and juicy as possible. A way to grow orange trees, called grafting, helps.

Grafting starts by cutting buds from the branches of healthy trees that have good fruit. The buds are then taken to a tree nursery where thousands of small orange trees are growing. A cut is made in each of them and a bud is attached. A brand new tree grows from each bud. And that new tree's fruit will be like the fruit from the old tree.... Delicious!

Question sent in by Lori Oldhem, Saginaw, MI.

# WELCOME TO PLANET EARTH

## Mambo's Advice to Aliens (as told to Jim Lewis)

"Gneep Zloleep!" (That's space talk for "Hi Folks!") My name's Mambo, and my job is to make space visitors feel welcome on Planet Earth. What's that? You've never seen a space visitor. We must go to different playgrounds.

How do I make space visitors feel welcome? Well, it's not as easy as giving them chocolate milk. (Although that helps.) Space aliens, you see, find Earth so unusual! Things that we take for granted can be confusing to space tourists.

Now, with your help, we can make these visitors feel at home. That's why I'm introducing *Welcome To Planet Earth*, the world's first advice column for people from other worlds!

We'll start with a question from Zik Nibolt from Planet Friplap. Zik's question, which was told to Melissa Kanapaux of Rockaway, NJ, is:

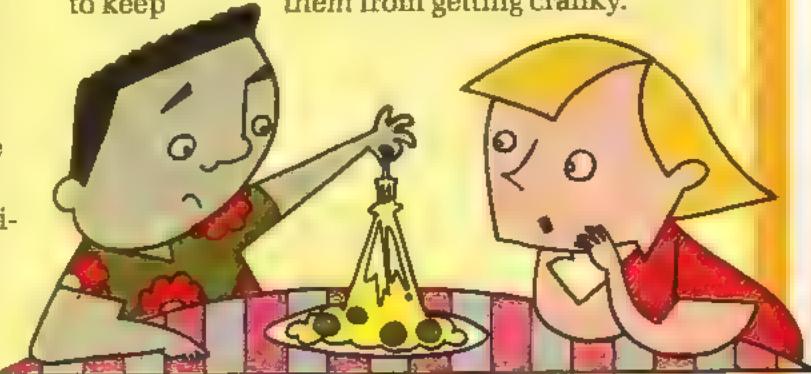
**"What's a vacation?"** Well, Zik, a vacation is when humans go someplace to relax. Relaxing to the max is fun. But, you must be able to handle "Vacation Situations." Here are three examples, and what I think you should do:



**Boring Ride-itis** Just before you leave on vacation, everyone is excited. Then, three minutes into your trip, it gets "sooooo boring!"

What to do: You can annoy your brothers and sisters. But I recommend making up travel games. You might try finding the strangest license plates. (The oddest I ever saw was from Guam, an island in the Pacific Ocean. How do

you drive from Guam to New Jersey?) Or you might pretend clouds are marshmallows and try eating your way to your destination. Your folks may want you to sing silly songs. Do this, if only to keep them from getting cranky.



**What's-This-Stuff Syndrome** You discover that people in other places eat strange foods.

What to do: Never say "What's this stuff?" It's not polite. Think of vacation as a time to experiment. You might actually like this green-and-yellow stuff! You could wait until you get home to eat again. But green-and-yellow stuff sure looks good when you're hungry.

**Rest Area Return** This happens as soon as you see a sign that says "Next Rest Area: 3,000 miles." Right away, you or a brother or sister will need to use the restroom.

What to do: Think of the desert. Count backwards from 3,000. Convince your folks it's time to get back to nature—fast—and pull the car over to the side of the road.

Well, Zik, this should help you have fun while taking a vacation on Earth. For now, this is Mambo saying "Frooop Gazortle!" (That's space talk for "So long, see you soon!")

### HELP MAMBO!

What would an outer space visitor want to know about life on Earth? Send questions to: **MAMBO!**, 3-2-1 Contact Magazine, 1 Lincoln Plaza, New York, NY 10023. If we print your question, we'll send you a CONTACT T-shirt.

# ENTER

## THE HIGH-TECH WORLD OF COMPUTERS

There's nothing strange about this cartoon. Everybody rides on buses where the passengers are computers. Don't they? On second thought, maybe there is something weird going on here. But what is it?

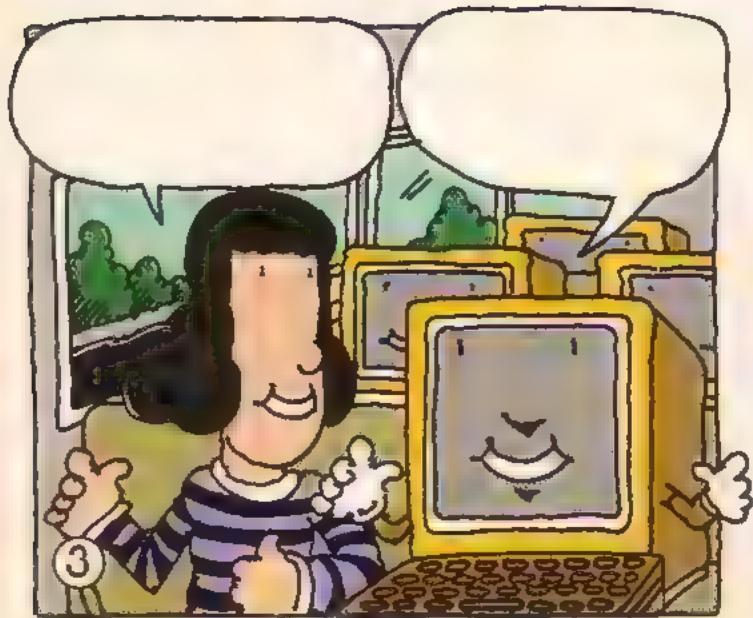
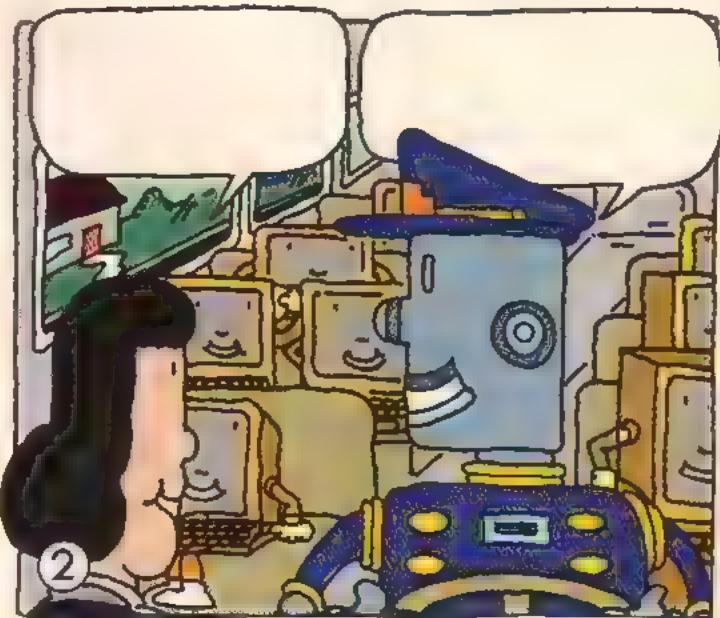
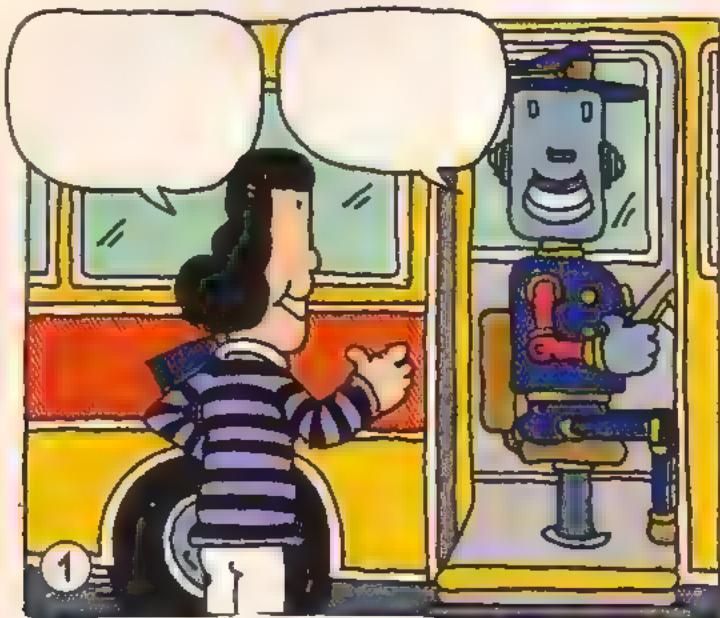
If you know what the girl, the

computers and the robot driver are saying, get out your pencil and fill in the cartoon balloons.

The top 20 storytellers will receive ENTER T-shirts. And we'll pick the best entries and print them in a future issue.

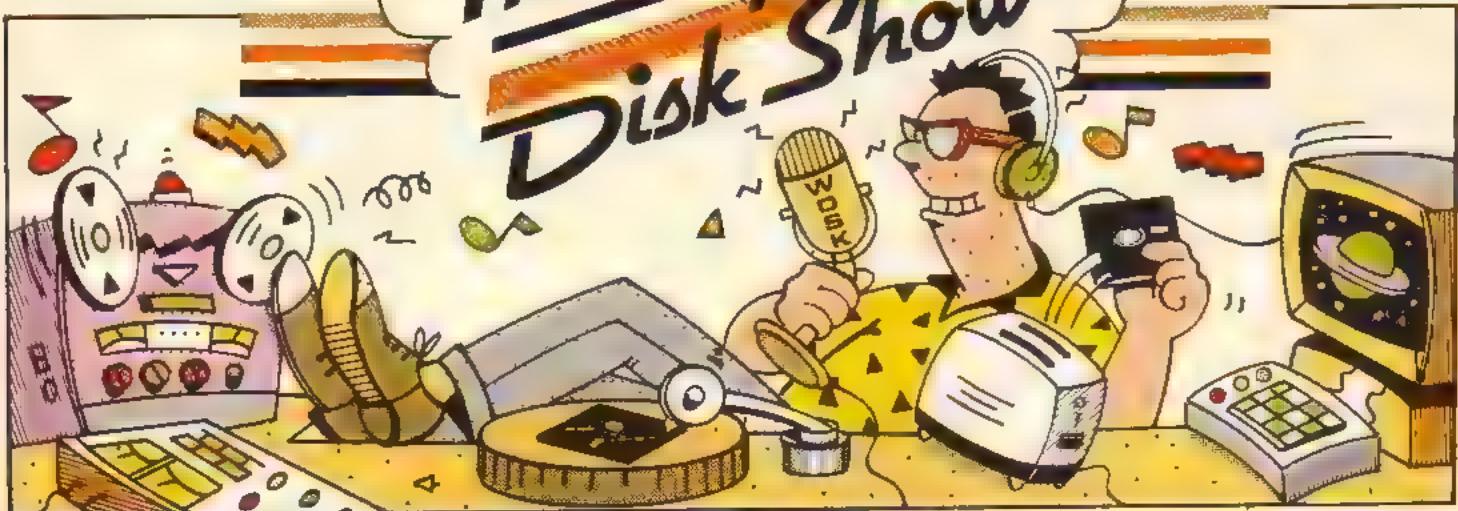
Meanwhile, keep your eyes open for a busload of disk drives.

When you're done, send this page to: **Hi-Tech Transit**  
**3-2-1 CONTACT**  
**1 Lincoln Plaza**  
**New York, NY 10023**



ILLUSTRATIONS © K. MARIE M'AD

# The Slipped Disk Show



ILLUS. BY RAY UNK & GAME HOME PAGE

Hi Ho! All you hackers, hi-teachers and hula-hoopers out there in microchip land. This is Slipped Disk, the floppy disk jockey, just waiting to hear your news, views, blues and shoes. Did I say shoes?

Speaking of shoes, we have a question here from Philip Smith, Jr. a native of the Windy City (That's Chicago). Philip asks:

## What does high resolution and low resolution mean?

Well, Phil, remember last New Year's Eve? Remember that promise you made to stop dropping your little sister's dolls from the tree in the backyard? That was one kind of resolution, but these resolutions are something entirely different. High and low resolution are different ways of creating pictures on a computer screen.

You probably know that video images are made up of tiny points of light called pixels. A high resolution (or high-res) video image uses each pixel separately. So a high resolution image can have much more detail. Curved lines are smoother, and pictures can be more lifelike.

High-resolution images take up a lot more room in your computer's memory. There are literally hundreds of thousands of pixels for

your computer to keep track of.

In a low resolution picture, your computer groups the pixels into blocks. Instead of lighting up one pixel at a time, the computer will light up a block of pixels.

Low-res pictures have jagged edges and a "computerized" look. You can't draw a very good curve. However, on most computers, you can use more colors in low-res than in high-res. It is also easier to fill the screen with color using low-res.

Well, I'm glad we resolved that one. Our next letter comes from Ron Rampolla of Flushing, New York, who asks:

**Is it possible to write a program that will pick the winning numbers of a state lottery? I figure since a machine randomly picks the winning numbers, why not have my computer do the same for me?**

Ron, you certainly are a generous fellow. Now everybody knows how to win! Soon the whole country will be made up of millionaires!

But seriously, it's not possible to write a program that can predict the winning lottery numbers.

It's true that lotteries are picked by machine or computer. They are programmed to pick numbers at random, in an order that can't be predicted. But that doesn't mean

that another computer will pick the same numbers. All computers are not plugged into one giant random number list. Different types of computers use different methods to produce random numbers.

After all, if you could pick the numbers with a home computer, the lottery wouldn't make any money—there would be too many winners.

So Ron, if you want to use your computer to pick your lottery numbers, go right ahead. Your odds of winning won't be any better than if you picked the numbers yourself. But the odds won't be any worse, either. And, uh, Ron, if you do win three or four million, you'll remember who gave you this great advice, right?

Well, that's all the time we have this month. So tune in next issue, same time, same magazine, for another great edition of the Slipped Disk Show. And remember, if you have any computer questions for your old buddy, Slipped, just mail them to:

**The Slipped Disk Show  
3-2-1 Contact Magazine  
1 Lincoln Plaza  
New York, NY 10023.**

See ya then!

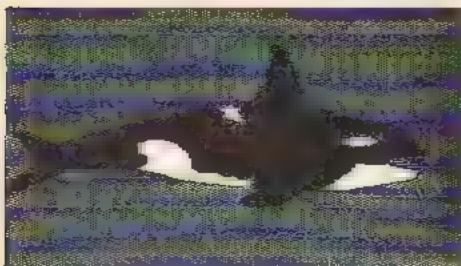
**Slipped Disk's wardrobe furnished by  
Mr. Louie of Flatbush.**

# NEWSBEAT

Edited by Jessica Wolfe

**Contest Mania!** Here's news about readers who had fun and won ENTER Contests:

**Artful Winners:** Congratulations to the high-tech artists who entered our ARTFUL COMPUTER CONTEST. Each of the winners received \$100 worth of software.



## Still-Screen Art

Anne Darlage of Trafalgar, Indiana, for her sailboat and seagulls, and Lars Hansen, 12, of Phoenix, Arizona for his killer whale.



## Still-Screen Art (using a graphics program)

Michael Yonkers, 11, of Jupiter, Florida for a surfer scene, and Mitch Davis, 14, of Syosset, New York, for a spooky castle.

## Animation Art

A chugging train created by Paul Kasel, 14, of Pittsburgh, Pennsylvania, and Jared Colflesh of Haverford, Pennsylvania, for an inspiring Olympic ceremony.

**Silly Word Winners:** The winner of our "Re-Name the Computer Part" Contest was Ross Bergseth, 12, of Deerfield Park, Illinois.

CURSOR DISPERSER ..... mouse  
RATA-DATA-TAT ..... printer  
DATA PLATTER ..... disk  
YOU-ARE-THERE SQUARE ..... cursor  
UNITE-A-BYTE ..... modem

Ross won an Apple IIc computer, thanks to Apple Computer Co. Our 10 runners-up will receive copies of More Sniglets, a book of silly words, courtesy of Collier Books.

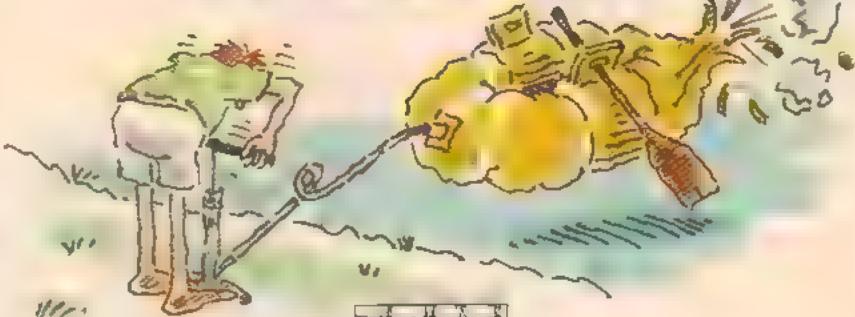
Here's a sample story using words invented by readers.

*Amanda decided to try out her hacker yacker. Amanda slipped a piece of binary finery into the factperambulator. With the phlange flicker, she input a number to get on-line.*

## The "ENTER Dictionary"

BINARY FINERY ..... Software  
FACTPERAMBULATOR ..... Disk Drive  
HACKER YACKER ..... Modem  
PHLANGE FLICKER ..... Keyboard

## HOW TO BLOW UP A RUBBER RAFT



First, you need a reason to use a rubber raft. (That's a snap if you've got ZORK® I, the classic fantasy story from Infocom's interactive fiction line. Because you'll be hunting twenty fabulous treasures while dodging every kind of evil under the earth.)

Next, type in your command: BLOW UP THE RUBBER RAFT WITH THE AIR PUMP... But watch it, or you might just blow up the raft until you blow yourself to smithereens!

There's no telling what will happen next in ZORK I—because, like all of Infocom's interactive fiction, ZORK's



designed so that whatever you choose to do makes the next thing happen. And you won't run out of things to do, either. The underground empire of ZORK is so huge, your adventure can last for weeks or even months.

So if you want the closest thing on a disk to really exploring an underground world, get ZORK I. But brace yourself for the action—it'll blow you away!

**INFOCOM**

\*It is compatible with almost every popular home computer. ZORK is a registered trademark of Infocom, Inc.

# REVIEWS

by Phil Wiswell and Bill Gillette



## Master of the Lamps

Activision; Commodore 64; \$29.95

Clean your ears before you play this game.

Chances are you've never heard music or sound effects as wonderful as this coming from your computer. *Master of the Lamps* sound effects makes you wonder why all software doesn't sound as good.

Unfortunately, the game itself doesn't match the sound. It's too simple. First you use your joystick to steer a flying carpet through a series of diamond shapes. The animation is good and the graphics are top notch.

But once you've survived the magic carpet ride, there's not much to do. The second part of the game has you trying to play the songs as fast as a magic genie. Even the gonging sound couldn't keep us awake.

### Wrap-Up

**Phil:** I loved the music and even the magic carpet ride—but not the part with the genie.

**Bill:** The game designers should have developed the first part of the game more. I might play with this software, but mostly to hear the music.

## Below The Root

Windham Classics/Spinnaker; IBM PC and PCjr, Commodore 64 and Apple II computers; \$26.95

Have you ever imagined becoming a character in a book? Well adventure game software like *Below The Root* lets you do just that. This software's fancy graphics and on-screen animation make you feel like part of the adventure. And your decisions help shape the story.

Once you've chosen your character, you move through the game using a joystick or the keyboard. Enter a room and you meet a stranger. Pop up the game's option menu and choose what to do next. Should you speak to the stranger? Offer her food? Try to read her mind? What happens is up to you!

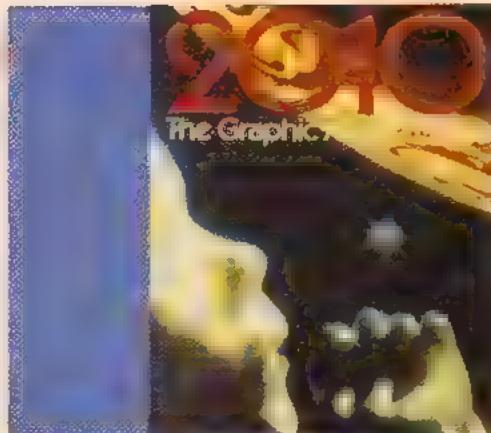
If you get halfway through an adventure and have to stop, the software lets you save your place. The next time you play, the game will begin right where you left off.



### Wrap-Up

**Phil:** *Below The Root* is a challenge to play.

**Bill:** There are many hints and clues along the way to keep the game going. This is an exciting adventure you won't get tired of.



## 2010

Coleco; ColecoVision, Adam; around \$34

Most computer games based on movies aren't worth a second look. *2010* is an exception to this rule.

Here's the setting: the spaceship *Discovery* will crash into Jupiter's moon unless you repair its four main systems. These systems are engines, communications, life support and HAL the computer. We'll give you a hint: It's a good idea to start by repairing HAL. This computer can help you a lot when you try to fix the other systems.

Each of *Discovery*'s damaged systems is made up of a circuit board with at least one bad part. You must fix the board so that a spark of electricity can pass through a maze of wires. By replacing and moving these wires, you create a path to carry the spark.

### Wrap-Up

**Bill:** This is the best ColecoVision game I've ever seen. It isn't fast paced, but just fast enough to keep you on the edge of your seat.

**Phil:** This game's great sound and graphics really add to the action.

## Short Circuit

MicroFun; Apple II, Atari, Commodore 64, IBM PC and PCjr.; \$19.95

That's right, Short Circuit sells for \$19.95. And MicroFun has lowered the price without lowering the quality.

In Short Circuit, you are in a maze of wires. Your job is to connect the right wires so that electricity will flow from one point to another.

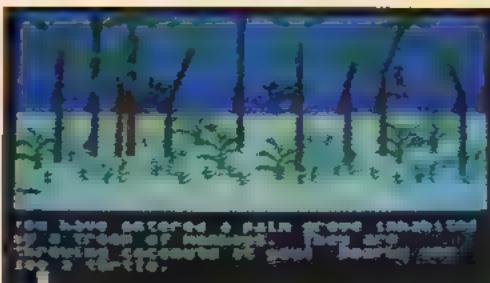
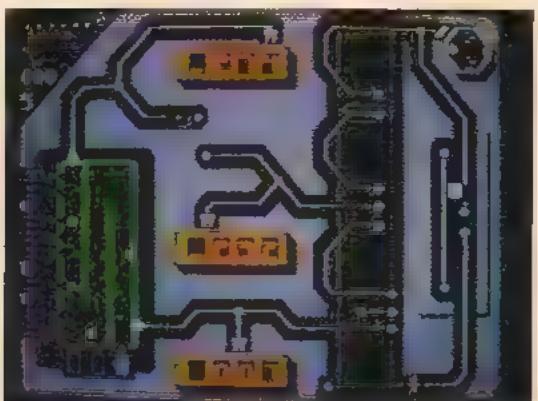
You'll need some joystick skill with this game. But more important, you need a quick mind. It's tough to keep track of all the connections you make. If you want the electricity to flow to the right spot, you'll need to remember exactly where each and every wire is connected.

Each of the game's seven levels is large and complicated. We're sure you won't get bored. Graphics and animation are fine. Unfortunately, the sound effects are poor. Oh well, you can't have everything for \$19.95.

### Wrap-Up

**Bill:** This is a very good game at a very good price. I'll play it for a long time to come.

**Phil:** I would rather play a game like 2010 because it's slightly more challenging than Short Circuit. But you're absolutely right: You can't beat the price.



## Swiss Family Robinson

Windham Classics/Spinnaker  
Apple II, Commodore 64, IBM PC and  
PCjr.; \$26.95

Swiss Family Robinson, the classic adventure story, is now a classic adventure game.

This game is easier to play than an adventure like Zork, but it is still

very complex. There are 255 different scenes to explore and lots of traps to avoid. Fortunately, none of the traps end the game. However, you can't just wander around the island willy-nilly. Your family is shipwrecked with you and it's your task to find them shelter, food, water and other necessary items.

### Wrap-Up

**Phil:** You can only use a limited number of command words in this game. But there are enough treasures to keep you happily busy.

**Bill:** The puzzles you have to solve in this adventure are easier than the puzzles in some other games. But they aren't too easy. It's an adventure you can really get involved in.

## HOW TO PUT A PLATYPUS UNDER YOUR SPELL



No one loves getting wet more than a duck-billed platypus. (That's pronounced 'plat-i-pus.') So if you want to make a platypus happy in WISHBRINGER, Infocom's amazing interactive magic adventure, just type in a magic spell: PICK UP THE MAGIC ROCK AND THE UMBRELLA. OPEN THE UMBRELLA, THEN WISH FOR RAIN.

You'll be glad to have a happy platypus on your side. WISHBRINGER's packed with danger. You'll face sorcerers,



kidnappers, even a stone that grants its owner's every wish. In fact, there's so much action, your adventure can last for weeks or even months.

Get the closest thing on a disk to real magic. Get WISHBRINGER. It's a great adventure and a great way to learn how to spell platypuses.

**INFOCOM**

\*It's compatible with almost every popular home computer. WISHBRINGER is a trademark of Infocom, Inc.

# basic TRAINING

PROGRAMS FOR YOUR COMPUTER

## Moving Messages

Atari

This program displays moving messages. We don't mean that you will be moved when you read them. We mean the words move.

Here's how it works: When you run the program, you'll get the regular cursor in the upper left hand corner of your screen. Just start typing, using any characters you want. You can use the cursor control keys to skip lines, to write backwards and move around. You can use the CLR key or any other key.

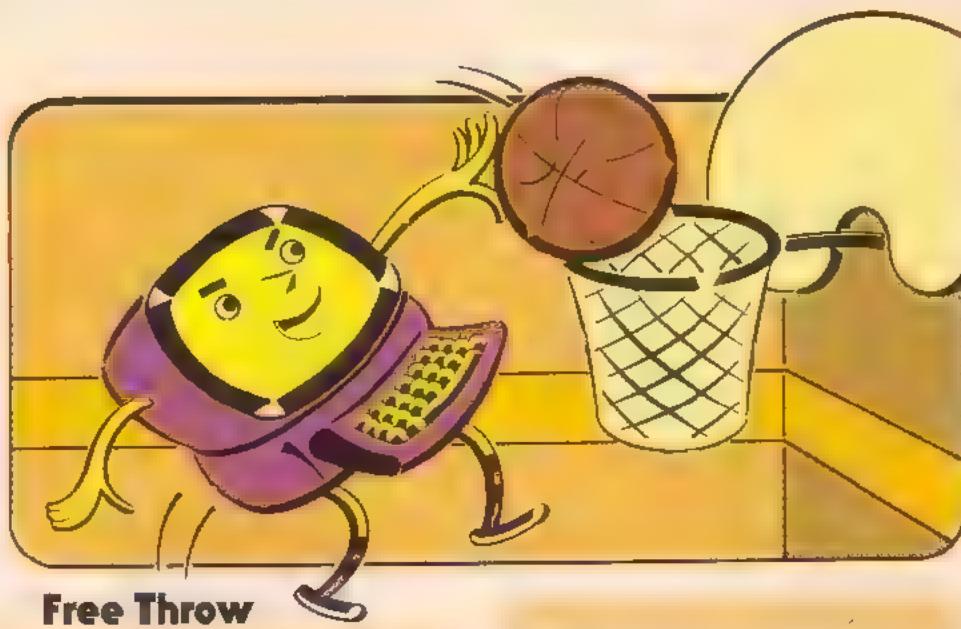
When you're done, hit RETURN and the program will "play back" exactly what you typed in. You can make messages that dance, move and run around. You can also draw animated pictures.

This program was written by **Doug Ryerson**, of Flushing, Michigan.

```

10 REM MOVING MESSAGES
20 DIM K$(12000)
30 OPEN #1,4,0,"K."
40 GRAPHICS 0
50 SETCOLOR 2,0,0
60 POKE 32,0
70 ?CHR$(125)
80 GET #1,K
90 IF K = 155 THEN 200
100 K$(LEN(K$) + 1) = CHR$(K)
110 ?CHR$(K).
120 GOTO 80
200 REM PLAYBACK
210 ?CHR$(125)
220 FOR L = 1 TO LEN(K$)
230 ?K$(L,L),
240 E = PEEK(84) + PEEK(85)
250 SOUND 0,E*3 + 30,10,8
260 NEXT L
270 SOUND 0,0,0
280 GOTO 80

```



## Free Throw

IBM PCjr and IBM PC with a Color Graphics Card

The score is 101 to 100 and your team is behind. There is one second left on the clock. The crowd is on the edge of their seats as you step up and take out your PCjr?????

As in real basketball, the aim of this game is to get the ball in the hoop. But there's one catch—the ball is moving.

To score a point, you must press the S key when the ball is directly under the hoop. (The spot is marked for you.)

Two points and an ENTER T-shirt go to **John Curley**, 13, of Colmar, Pennsylvania.

```

10 REM FREE THROW
20 KEY OFF:SC = 0:CLS
30 PRINT TAB(9),"FREE
THROW PRACTICE"
40 PRINT "USE S KEY TO SHOOT"
50 PRINT "PRESS ANY KEY TO
START"
60 P$ = INKEY$
70 IF P$ = "" THEN 60
80 SH = 15
90 SCREEN 4:CLS

```

```

100 COLOR 1
110 PALETTE 1,6
120 IF T = 0 THEN CLS
130 CIRCLE(152,160),12
140 PAINT(152,160),4
150 COLOR 31
160 LOCATE 1,13
170 PRINT "** FREE THROW **"
180 LINE (102,10) - (202,10)
190 LINE (102,12) - (202,12)
200 LINE (142,12) - (142,18)
210 LINE (162,12) - (162,18)
220 LINE (142,18) - (162,18)
230 CIRCLE (152,32),16
240 LINE (92,16) - (92,47)
250 LINE (212,15) - (212,147)
260 LINE (92,147) - (212,147)
270 CIRCLE (152,147),60
280 W = INT(RND*7) + 2
290 FOR X = 102 TO 202 STEP W
300 CIRCLE (X,160),12
310 SHOT$ = INKEY$
320 IF SHOT$ = "S" THEN 350
330 NEXT X
340 GOTO 390
350 FOR Q = 160 TO 30 STEP 5
360 CIRCLE (X,Q),12
370 NEXT Q
380 IF X > 148 AND X < 156
THEN 460
390 LOCATE 22,1
400 PRINT "NICE TRY..."
410 PLAY "01 E4 D2 E4 C2"
420 FOR DE = 1 TO 3000 NEXT
430 SH = SH + 1
440 IF SH < 1 THEN 520
450 GOTO 90

```

```

460 K$ = "NICE SHOT!"  

470 IF X = 152 THEN K$ =  

    "PERFECT!"  

480 LOCATE 22,1:PRINT K$  

490 PLAY "02 C16 D16 E16 G8 E16 G6"  

500 SC = SC + 1  

510 GOTO 420  

520 CLS  

530 QA = INT(100*SC/15)  

540 PRINT "YOU MADE ";SC;  

    " OUT OF 15 SHOTS"  

550 PRINT "THAT'S ";QA;  

    " PERCENT"  

560 INPUT  

    "PLAY AGAIN? Y/N";P$  

570 IF P$ = "Y" THEN 30

```

## Rainbow Rectangles

TI 99 4/A

There's more to this program than meets the eye. It draws 12 rectangles on your screen, but you can't see them!

To make them appear, you press one of the letters of the alphabet from A to L. A musical note will sound for each one. Then, try pressing the letter M.

Rainbow Rectangles was written by Scott Vachalek, 12, of Hollywood, Maryland.



```

10  DIM Z(12)  

20  CALL CLEAR  

30  CALL SCREEN(2)  

40  FOR A = 32 TO 120 STEP 8  

50  CALL CHAR(A," ")

```

```

60  NEXT A  

70  B = 32  

80  C = 24  

90  FOR D = 1 TO 12  

100 CALL HCHAR(D,D,(D*8) + 32,B)  

110 CALL VCHAR(D,D,(D*8) + 32,C)  

120 CALL HCHAR((D + C) - 1,D,  

    (D*8) + 32,B)  

130 CALL VCHAR(D,(D + B) - 1,  

    (D*8) + 32,C)  

140 B = B - 2  

150 C = C - 2  

160 NEXT D  

170 CALL HCHAR(12,12,32,10)  

180 CALL HCHAR(13,12,32,10)  

190 CALL KEY(5,K,S)  

200 IF S = 0 THEN 190  

210 IF K = 77 THEN 340  

220 IF K > 76 THEN 190  

230 IF K < 65 THEN 190  

240 Z(K - 64) = Z(K - 64) + 1  

250 IF Z(K - 64) < 3 THEN 270  

260 Z(K - 64) - 1

```

```

270 IF Z(K - 64) = 2 THEN 310  

280 CALL COLOR  

    (K - 64,K - 60,K - 60)  

290 CALL  

    SOUND(100,(K*10) + 110,0)  

300 GOTO 190  

310 CALL COLOR(K - 64,1,1)  

320 CALL  

    SOUND(100,(K*10) + 110,0)  

330 GOTO 190  

340 FOR X = 1 TO 5  

350 FOR Y = 1 TO 12  

360 CALL COLOR(Y,Y,Y)  

370 CALL  

    SOUND(100,(Y*100) + 10,0)  

380 NEXT Y  

390 FOR W = 1 TO 12  

400 CALL COLOR(W,1,1)  

410 CALL  

    SOUND(100,(W*100) + 10,0)  

420 NEXT W  

430 NEXT X  

440 GOTO 190

```

**HOW TO FEED  
A SEA MONSTER**

First, locate a sea monster. (The best place to find one is in **SEASTALKER**, the brand-new undersea story from Infocom's interactive fiction line.)

Next, type in your command: **GET OUT OF THE SUBMARINE AND FEED THE CATALYST CAPSULE TO THE MONSTER**. Then, swim for your life! Because the trouble with feeding sea monsters is, the monster might decide to feed on you!

There's no telling what will happen next in **SEASTALKER**. Because, like all of Infocom's interactive fiction, **SEASTALKER**'s designed so that

what happens next depends on what you decide to do. And you'll be doing plenty, too—your voyage can last for weeks or even months.

So get the closest thing on a disk to going on a real-life sea adventure. Sink your teeth into **SEASTALKER**. But when you do—watch out!—or you might just find out somebody has a sweet tooth for you!

**INFOCOM**  
\*It's compatible with almost every popular home computer. **SEASTALKER** is a trademark of Infocom, Inc.

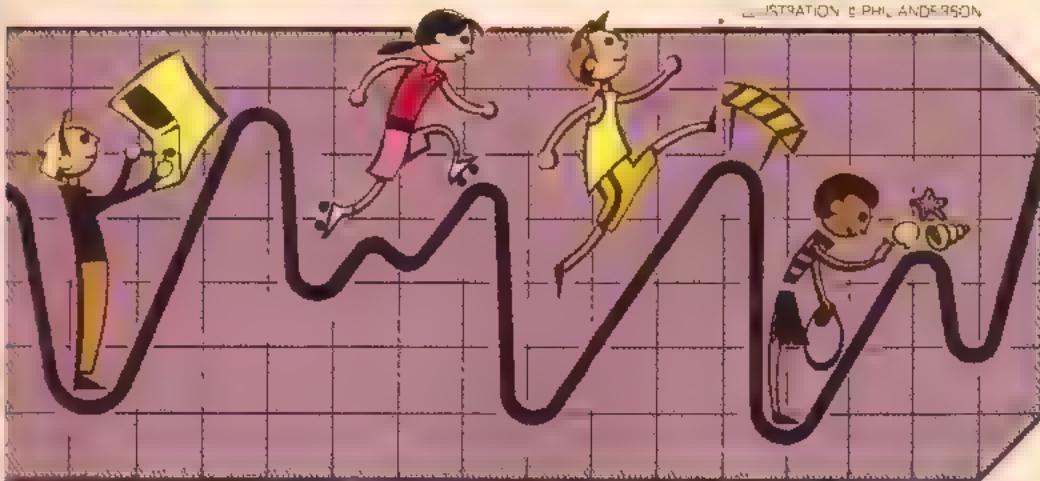


ILLUSTRATION © PHIL ANDERSON

## Winner of Challenge #12

### Sport Graph

#### Apple

For Programming Challenge #12 we asked you to write a program that would help someone with their hobby. We received lots of entries, but we liked this one most.

Sport Graph was written by **Erol Baskurt, 13, of Poplar Bluff, Missouri.** It was designed to help athletes keep track of their progress by drawing a line graph of their finishing times. But with a few changes, it can be used for other hobbies, too.

The program asks for the number of races to be graphed. It also asks for the range of the fastest and slowest times and the name of the event (like 200-yard dash, hurdles, etc.).

In lines 150 to 240, the program will ask you to input each finishing time and the date of the race, in order. Then in lines 250 to 360 it draws the graph.

This program can easily be used for other hobbies. For example, you

could graph the number of seashells you collected on different trips to the beach, or the scores you've made on your favorite video game.

```

10  REM GRAPH
20  DIM TI(14),DTE(14)
30  A = 0 D$ = CHR$(4)
40  REM INPUT TIMES
50  TEXT : HOME
60  INPUT "ENTER THE NUMBER OF RACES (BETWEEN 2 AND 14)";NO%
70  INPUT "WHAT EVENT ";EVT$
80  PRINT "WHAT IS THE RANGE OF TIMES (LOWEST TO HIGHEST?)"
90  PRINT "1. 0 TO 80 SECONDS?"
100 PRINT "2. 80 TO 160 SECONDS?"
110 PRINT "3. 160 TO 240 SECONDS?"
120 INPUT RNG
130 REM INPUT TIMES
140 PRINT
150 FOR X = 1 TO NO%
160 PRINT "INPUT TIMES IN CHRONOLOGICAL ORDER"
170 PRINT "INPUT TIME NUMBER ";X
180 PRINT "IN SECONDS"
190 INPUT TI(X)
200 IF RNG = 2 THEN TI(X) = TI(X) - 80
210 IF RNG = 3 THEN TI(X) = TI(X) - 160
220 TI(X) = INT(ABS(TI(X)) +
5) * SGN(TI(X))

```

```

230 INPUT "ENTER MONTH AND DAY OF RACE IN NUMBER FORM (MO/DAY)";DTE$(X)
240 NEXT X
250 REM DRAW GRAPH
260 PRINT CHR$(17)
270 HGR : HCOLOR = 7
280 FOR X = 1 TO NO%
290 HPLOT A,0 TO A,191
300 A = A + 280 / NO%
310 NEXT X
320 A = 0
330 FOR X = 1 TO NO% - 1
340 HPLOT A,160 - TI(X) * 2 TO A + 280 / NO%,160 - TI(X + 1) * 2
350 A = A + 280 / NO%
360 NEXT X
370 REM TEXT WINDOW
380 A = 0. HOME
390 PRINT D$;"PR#3"
400 VTAB 21
410 FOR X = 1 TO NO%
420 POKE 36,A: PRINT DTE$(X),
430 A = A + 80 / NO%
440 NEXT X
450 PRINT : PRINT "EVENT"; EVT$
460 PRINT "RANGE OF GRAPH"; ..
470 IF RNG = 1 THEN PRINT "1 SEC. TO 80 SEC.": GOTO 500
480 IF RNG = 2 THEN PRINT "80 SEC. TO 160 SEC.": GOTO 500
490 PRINT "160 SEC. TO 240 SEC."
500 HTAB 40: PRINT "PRESS ANY KEY TO CONTINUE"
510 GET A$
520 TEXT : HOME
530 INPUT "WOULD YOU LIKE TO DRAW ANOTHER GRAPH Y/N ";ANS$
540 IF ANS$ = "Y" THEN 30
550 END

```

### Corrections

Some of the adaptations of Virus Attack in the March 1985 issue of ENTER were wrong. The versions for IBM, TRS-80, Atari and TI 99/4A should have contained this line: 610 REM

Line 120 in the Breakdance program in the March issue should have read: 120 CALL KEY (0,BD,N)

# THE BLOODHOUND GANG

## The Case of the Stolen Sword

by Michael J. Dayton

**V**ikki was fanning herself with a newspaper when Skip and Ricardo entered the Bloodhound Gang's office.

"Whew, is it ever hot out there," Ricardo said, wiping his brow. The city was in the midst of the worst heat wave on record.

"There's only one thing that will save us from this hot weather," Skip said. "Let's walk down to the ice cream store and dive into a nice cool banana split."

"I say we go diving all right—into a nice cool swimming pool," Vikki said. "Captain Syd invited us over to go swimming."

"What are we waiting for!" yelled Ricardo. "I'm a fool for a pool!"

The Gang went to their homes, grabbed suits and towels, then headed to Sydney's home.

Sydney's family lived near the edge of town in an old mansion the size of a small ship. Sydney's father was an ex-navy admiral. Now, he worked as a professional scuba diver. He had made a fortune salvaging sunken treasure ships.

Sydney Jr. had picked up many of his father's naval expressions. That's why he was known around school as "Captain Syd."

When the Bloodhound Gang arrived, Sydney was in his bedroom. The room was simply decorated with a bed, an oak dresser, and a large

A black and white illustration showing three boys in a room. One boy is in the foreground, looking down at a sword on a stand. Another boy is in the middle ground, and a third is in the background. A clock is visible on the wall in the background.

**G**etting to the Point

As they entered the bedroom, Sydney

picked up a sword.

"Ahoey, you landlubbers," he shouted. "It's time to walk the plank!"

"Where did you get that sword?" Ricardo asked.

"My father found it on his last dive," Sydney explained. "It came from an old Spanish ship."

The members of the Gang examined it closely. The sword was studded with jewels and in perfect condition. Sydney told them that his parents had reluctantly agreed to let him keep the sword while they were away on a trip.

"Sydney, that must be worth a fortune," Vikki said. "Aren't you afraid someone might steal it?"

"It's perfectly safe here. I have an alarm system in this cabinet," he insisted.

"How does it work?" Ricardo asked.

"It's simple," Sydney said. He opened a cabinet drawer. The Bloodhound Gang quickly covered their ears as a piercing alarm sounded.

"It's like turning on a light switch," ➤

Sydney said, "Electricity flows in a loop. There are two wires inside the drawer. When the drawer is closed, the two wires don't touch. So electricity can't flow through them."

"When the drawer is opened, the wires connect. That allows electricity to flow through the wires and the alarm goes off. I showed all the help the sword and the alarm. So they wouldn't dream of stealing it."

Sydney glanced at the clock above the cabinet. "Before we go swimming, let's eat."

"Great!" Skip said. "What are we having?"

"Fish sandwiches, of course," Sydney said. They headed down the hall toward the kitchen. The maid was in one room vacuuming. A carpenter was in another room, repairing a light fixture. In the dining room, the butler was polishing the table. He gave them a mysterious smile as they passed.

"Sydney, do you always have all this help?" Vikki asked.

"No," he replied. "My sister is getting married



here tomorrow. These people are here just for the day to get the house in order."

They ate lunch in a small room off the kitchen. As they ate, the maid, Molly, entered lugging a vacuum cleaner.

"I guess your mom will have to buy a new vacuum cleaner," Molly said. "This one just died on me. Funny, it was working fine just a minute ago."

Sydney jumped up from the table. "Here, maybe I can fix it."

Sydney plugged the machine in and it roared to life.

"Well," she said in surprise. "I guess the plug

was loose." She left to finish her cleaning.

"Okay, it's time to hit the high seas," Sydney said when they had finished their lunch.

"I left my suit and towel in your room, Sydney," Skip said.

"C'mon, let's go get it," Sydney said.

They climbed the winding stairs to Sydney's room. The butler was still polishing the table. Again he gave them a strange smile. But the maid and carpenter were nowhere in sight.

## Something's Fishy

When they reached the bedroom, Sydney opened his cabinet. Two alarms sounded—one from the cabinet, and a howl from Sydney.

"There's been a mutiny around here," Sydney cried. "Some pirate has stolen the sword! But I can't understand how anyone could get it out of the cabinet without setting off the alarm."

"How do you turn off the alarm?" Ricardo asked.

"There's a switch inside the cabinet," Sydney said. He pressed it and the alarm stopped. "But the alarm sounds first when you open it. We would have heard it from the kitchen."

Vikki looked at the wall clock, then checked her watch. "Interesting. The electric clock lost five minutes while we ate lunch."

"When my dad finds out it's missing, I'll walk the plank for it," moaned Sydney.

"All three people were up here while we were eating lunch," Skip said. "Any one of them might have done it."

"But whoever took it would not have risked walking down the hall with the sword," Ricardo said.

"That's true," remarked Vikki. She stared out the window and down at the goldfish pond just below. "Let's go talk with those workers."

They talked with the butler first. He had just finished the table. It shined like a harvest moon.

"I bet the butler did it," whispered Skip. "The butler always does it."

"Okay, Baxter, where were you in the last half hour?" demanded Sydney.

"I've been shining this table for over an hour."

"You missed a spot there," pointed out Skip.

"So I did," he said, and continued polishing.

At that moment, Molly and Sherman, the carpenter, came up to Sydney.

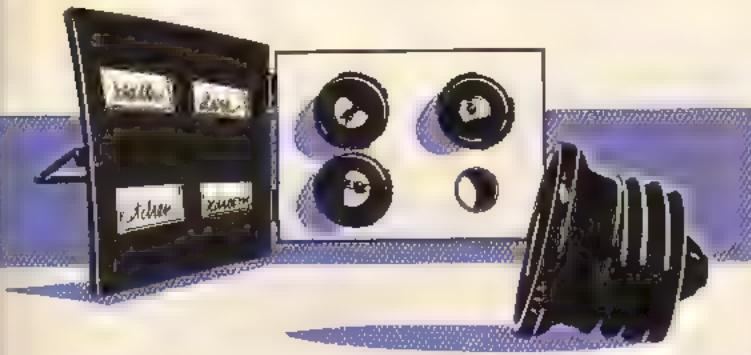
"That light is fixed, so I'm done for the day," Sherman said.

"I'm finished also," the maid said. "Work rules. I can't work past two," she added.

The butler glanced at his watch. "It's two already? My word. I must be going also."

The three workers left the room together.

"Skip, follow them and make sure they don't pick up the sword on their way out," Vikki



whispered.

"Got you," Skip said.

"But what about my sword?" Sydney protested. "If they leave, I might never get it back."

"Don't worry," Vikki assured him. "I know exactly where your sword is. And if my hunch is right, I also know who took it. We'll catch the thief tonight. Now, here's what we have to do...."

## The Gang Foils the Thief

That evening, the Bloodhound Gang and Sydney waited in the darkness in Sydney's room. With them was Sergeant Trowbridge from the town police department. Sergeant Trowbridge had helped the Bloodhound Gang on an earlier case.

"I sure hope this works," whispered the police officer. "I'd sure like to nail this thief."

"We'll know soon enough," Vikki said.

"Listen," whispered Ricardo. "I hear somebody splashing in water."

"Now!" yelled Vikki. "Turn on the floodlights."

Sydney flicked a switch. Outside, the goldfish pond was bathed in brilliant light. Standing in the goldfish pond was Sherman, the carpenter. The sword was in his hand.

"W-what the?" he said, blinking at the bright lights.

"Stay right there," shouted Sergeant Trowbridge. "You're under arrest!"

"Good going, Gang!" the officer said as he slapped handcuffs on Sherman.

"I was right," Vikki said. "It was Sherman."

"How did you know it was him?" asked Sydney.

"That's easy," Vikki said. "To open that cabinet without setting off the alarm, someone had to turn off the electricity. Someone obviously did."

"That's right," Ricardo said. "Remember? The electric clock stopped for five minutes while we ate lunch."

"Exactly," Vikki said. "While working on that light fixture, Sherman probably went down to the fuse box and disconnected the power."

"But couldn't the butler or Molly have gone in there while the power was off?" Skip asked.

"They both could have," Vikki said. "But neither realized the power was off. The butler wouldn't have noticed. He wasn't using anything electrical. He was polishing the table."

"And Molly thought the vacuum cleaner was broken," Ricardo said. "She didn't realize the power had been turned off upstairs."

"So five minutes was all the time Sherman needed to take the sword, throw it out the window, then put the fuse back in," Sydney said.

"Then he just went outside and stashed it in the goldfish pond for safe keeping," added Vikki.

"Well, I guess Sherman has learned a valuable lesson," Skip said.

"I'm almost afraid to say anything, but what lesson is that?" Vikki asked.

"That the State Pen is mightier than the sword," he said.

"Thanks," Ricardo said. "I thought you were going to say that we caught a swordfish."

**Watch for next month's  
Bloodhound Gang  
mystery!**





# RETURN TO OZ

A BEHIND-THE-SCENES LOOK AT A NEW MOVIE

by Ken Wilson

After 46 years, Dorothy is finally going back to the land of Oz. Her journey takes place in the new movie, "Return to Oz." This fantasy is a follow-up to "The Wizard of Oz" which was made in 1939. "Return to Oz" is the first time moviemakers have combined real live actors with mechanical creatures and with walking, talking, moving characters made of clay.

In addition, the "old" Oz favorites are also returning—the Tin Man, the Scarecrow, and the Cowardly Lion. In this movie, however, these characters don't look anything like they did in "The Wizard of Oz."

Tin Man, Scarecrow, and the lion look the same as they did in author L. Frank Baum's original Oz books. The stories were written between

1900 and 1919. "We've made them look like the original book drawings," explains Gary Kurtz, one of the people responsible for making the movie. (Gary also worked on the mega-hit, "Star Wars.")

The film's action takes place a few weeks after "The Wizard of Oz" ends. While Dorothy's Uncle Henry and Aunt Em clean up after the tornado, Dorothy makes another journey back to Oz. There she finds Emerald City in a mess. The city and her old friends, the Cowardly Lion, the Scarecrow, and the Tin Man have been turned to stone by the evil Gnome King.

Dorothy sets out to find the Gnome King to ask him to return Emerald City to normal. Along the way she meets some new mechanical

**Right:** Jack Pumpkinhead starts off as a sketch. Then a full-scale model is made. Yes, that's a real pumpkin on Jack's head.



friends. They are Tik-Tok, a man made of metal, Jack Pumpkinhead, a stick man, the Gump, a moose head, and Bellina, a talking chicken. Bellina becomes Dorothy's best friend and guide during her travels in Oz.

These new creatures are the mechanical stars of the movie. They are on the screen for most of the film.

### Creature Features

The fantastic characters were all designed by the same person, Lyle Conway. Lyle is the man in charge of the movie's "creature design." The Oz characters were built by a staff of 15 people. It took the filmmakers nine to 10 months to build each one. One of the people who worked on making Bellina, Tik Tok and the others is Steven Norrington.

"The great thing is that the creatures in this movie are believable characters with personalities," Steve told CONTACT.

Since this is the computer age, most people would think that a movie like this would rely on computers to make its creatures move. That's not true in "Return to Oz."

The mechanical characters come alive on the screen in two ways. Their movements are controlled either by radio remote control or by a system of hand-controlled levers. The hand-controlled levers are connected to cables. Each cable moves one part of the creatures. Technicians stand off camera to operate these figures.

The remote controlled creatures are operated just like model planes or cars. "In some cases," Steve says, "We use both methods."

Take Bellina the chicken, for example. There are actually seven different chickens. Some are radio remote controlled. Others are hand puppets. Some, like the head and feet, are separate body parts. These are used for close-up shots. ►



**Left:** A sculptor uses clay to make a model of the Scarecrow's head.

When you see Bellina under Dorothy's arm, it's usually the remote controlled bird.

"For close-ups, it's usually a hand puppet of her head. Then Bellina is controlled by as many as four different people," Steve explains. It takes one person to move Bellina's eyes, another to move her head, and two more to move her neck and her mouth.

According to the people who built the creatures, the best way to make them look as real as possible is to move them by hand. "The head, and especially the eyes, are what makes a creature look alive," says Steve. "Their movements are more lifelike if you don't use computers."

The Tik-Tok Man looks like a combination of R2-D2 from *Star Wars* and a couple of large copper kettles. In close-up shots, he is moved by technicians pulling levers. In far away shots, he is operated by two short actors inside him.

The Gump is a moose's head mounted on a piece of wood. His complicated movements are done by up to eight technicians using hand controls. It takes two of them just to work his mouth.

Jack Pumpkinhead is controlled by three tech-

nicians. One operates his head and shoulders, one works his legs and the other moves his arms. In close-ups, Jack's hands are moved by a radio remote control.

### **There's No Place Like Gnome**

"Return to Oz" is one of the first movies of its kind to combine clay animation and human characters. The underground world of the evil Gnome King and his followers is almost all done in clay animation.

Will Vinton was in charge of doing this. According to Will, clay animation is a slow, difficult process. "It took us over a year-and-a-half to make the 20 minutes of film that you'll see on the movie screen," he says.

Just like hand drawn cartoons, where the characters come "alive," one second of film is really 24 separate frames. Clay animators make sculptures the way you'd make a clay bowl or dish—by hand. The figures are moved

**Below:** Dorothy makes a roaring entrance to the Emerald City on the back of the Cowardly Lion.





**Left:** Bellina the talking chicken is part hand puppet, part mechanical creature. Here, a puppeteer is practicing getting the most "chicken-like" movements out of Bellina.

only a few millimeters in each frame. On a good day, Will's crew of 25 animators could complete 150 frames. That's only a little over six seconds on the screen.

The Gnome King and his followers begin as faces carved into rock. Before your eyes, they spring forth from the rock into moving clay. It took careful work. But that wasn't the hardest thing the clay animators had to do.

"Our biggest problem," says Will, "was putting human characters together with clay characters in the same scene." That was done in a number of different ways. The animators keep moviegoers from catching on to how they did it by changing methods.

One way was to use a split-screen. That means they filmed live action with human actors on one piece film. With another camera they shot the clay figures. Then they combined them.

Still another method was to film the live action first. That film was then run on a screen in the background. While that ran, the clay figures were filmed in front of it. ➤

**Below:** Steve Norrington works on getting the robot Tik Tok into shape. In some scenes, a person hidden inside the robot makes it move.

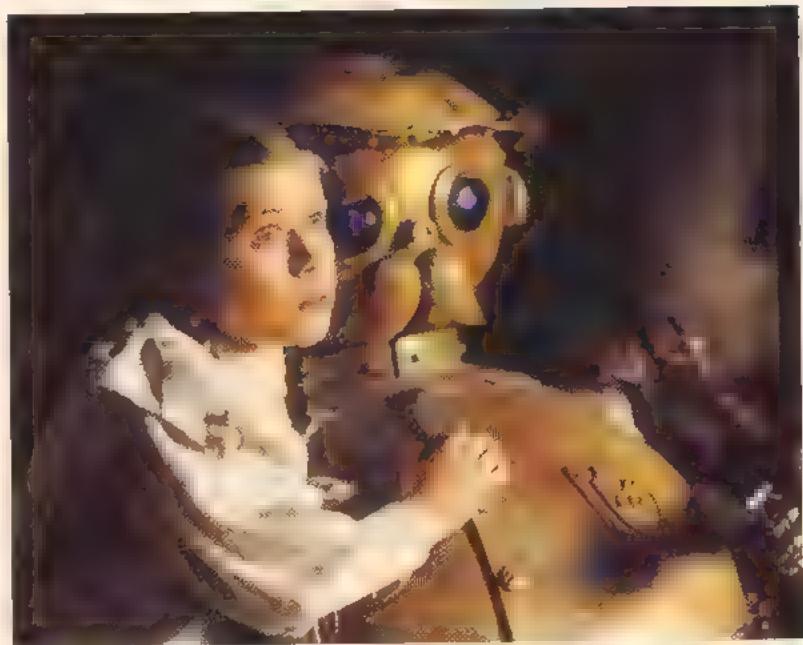


**Right:** How do you walk like a fantastic animal? This actor is learning by using short crutches. The padding will help fill out the animal's costume.

**Below:** Tik Tok and Dorothy get set to meet the Wizard.



PHOTOS © 2005 WALT DISNEY PRODUCTIONS



### Computer Moves

According to Will, computers were used in the clay animation. But they were used for only a short time. The animators used computers only to help them experiment with different character movements. The computer showed them the most natural and lifelike ones. When it came time to actually film the clay characters, however, their movements were all done by hand.

"Return to Oz" is a new look in movies. And everyone agrees that it's completely different from the original "Wizard of Oz." Will it go down in history as a classic? Only time will tell. But the people who worked so hard to come up with the Tik-Tok Man and Bellina the Chicken hope they won't have to wait another 46 years until a new version of Oz comes out!

### Are You a Wizard?

You may be if you can answer these "Wizard of Oz" questions. Try taking this quiz. You'll see there's more hot air here than in the tornado that swept Dorothy off her feet! By the way, the answers are on the Did It! page.

1. The road in the "Wizard of Oz" was paved with  
(a) yellow bricks  
(b) Krazy glue  
(c) Toto's lunch

2. Where did the name "Oz" come from?

(a) an old TV show called "Ozzie and Harriet"

(b) the place where Ozzy Osbourne grew up

(c) a filing cabinet

3. If Dorothy walked into a shoe store she'd ask for a pair of

(a) emerald shoes to get to Ruby City

(b) ruby shoes to get to Emerald City

(c) high-tops to get to the basketball game

# Letters



PHOTO COURTESY OF THE DAILY SENTINEL TRIBUNE, BOWLING GREEN, OH

## Kids Help Statue of Liberty

Dear 3-2-1 CONTACT,

I really enjoyed reading your article about the Statue of Liberty (July/Aug. '84) and like other kids wanted to help raise money.

When I told my best friend Tonya Fries, she wanted to help too.

So last summer we had a garage sale to make money for the Statue of Liberty. We sold some of our own dolls and games. I also made potholders to sell and helped out with chores for my mother and grandmother.

All together we raised \$86.14! Thanks to your suggestion that kids can help too, our project was a success.

Shannon Bockbrader  
Perrysburg, OH

Dear Shannon,

We're REAL proud of what you and your friends did to help out the Statue of Liberty. And we're pleased as could be that our plea for the "Lady in Distress" was heard by so many of you who read CONTACT. We received loads of letters in response to our story. Thanks!

## Fact Checkers

Dear 3-2-1 CONTACT,

Do you have your own scientists to find out facts about different things?

Andrew Rakowski  
Audobon, PA

Dear Andrew,

We sure do. We have a group of scientists who look over our shoulders and make sure we have all of our facts checked out. They are our "advisors." Also, whenever we do a story, we always ask scientists or other experts for the latest information on the article we're doing.

## Don't Take Your Time!

Dear 3-2-1 CONTACT,

How long do you give us to send in our contest entries?

Dan Kelly  
Bethel Park, PA

Dear Dan,

Most of the time, you have about a month or six weeks to write us. So keep those contest entries coming in. We're waiting by the mailbox.

## Fill in the Blank

Dear 3-2-1 CONTACT,

I have an idea for your magazine. I think you should write a story but don't end it. Then ask the readers to send in an ending. Print the best ending that you receive and give that reader a T-shirt.

Brian Caron  
Canterbury, CT

Dear Brian,

What a super suggestion! We're so glad when our readers write and give us new ways to make CONTACT better. We've already done one "write-your-own" ending in our December/January issue. And we'll be doing another real soon. So keep your eyes glued for another "finish-the-story" in a future issue.

## Pretty Funny

Dear 3-2-1 CONTACT,

What I wanted to know is if you could put in some funnies or a do-it-yourself cartoon!

Susan Eddy  
Thompson, CT

Dear Susan,

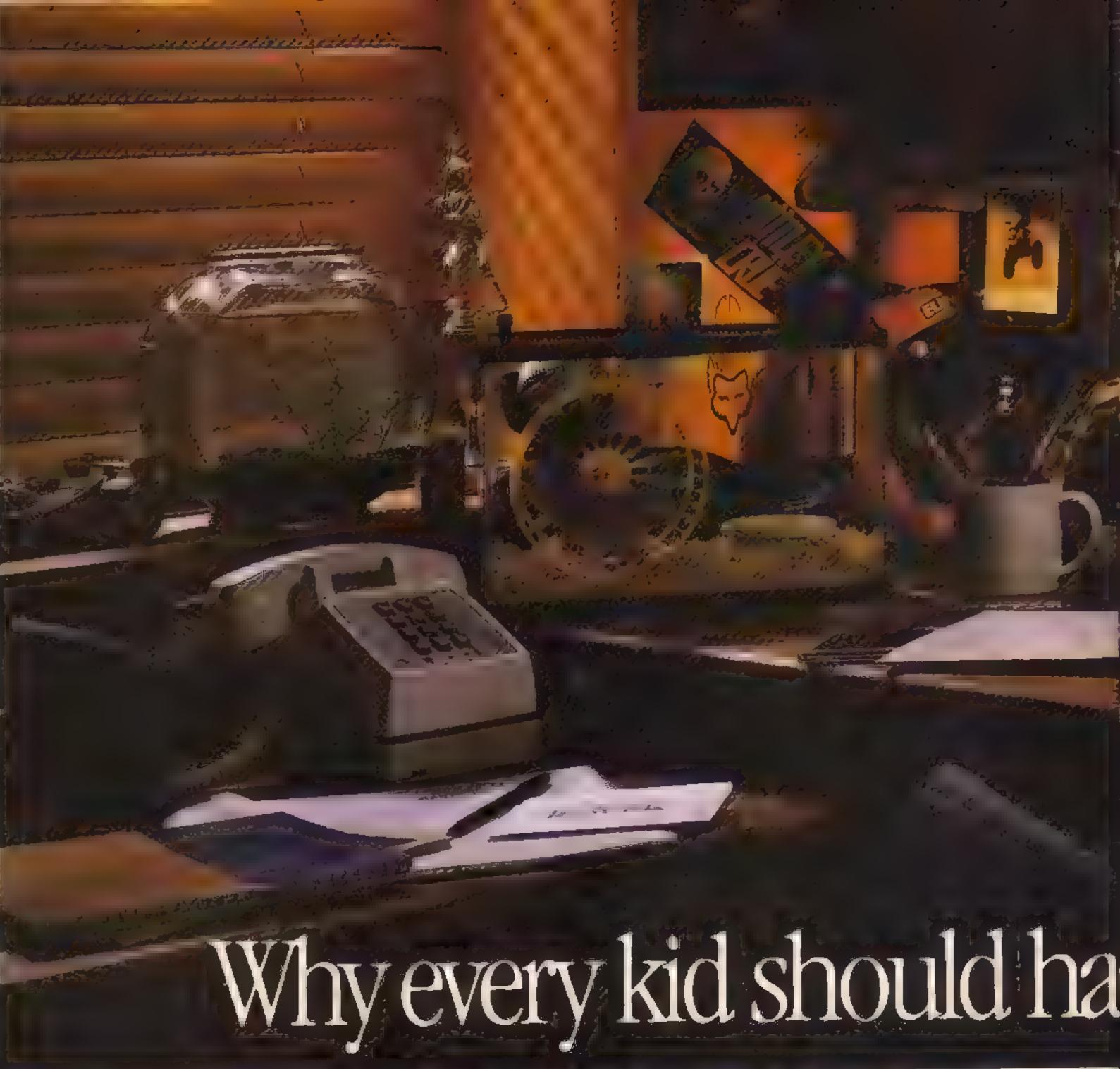
Talk about timing. This month's CONTACT features a full page do-it-yourself comic strip contest. Just turn to page 15 in our ENTER section, get out your pencil and start cartooning.

## We Want Mail!

Dear Readers,

We really love hearing from you. The questions, ideas, and complaints we get help us make CONTACT a better magazine. So why not drop us a line? We can't answer every single letter, but we do read them all. Send your mail to: 3-2-1 CONTACT

P.O. Box 599  
Ridgefield, NJ 07657



# Why every kid should have an Apple IIc

Today, there are more Apples in schools than any other computer.

Unfortunately, there are still more kids in schools than Apples.

So innocent youngsters (like your own) may have to fend off packs of bully nerds to get some time on a computer.

Which is why it makes good sense to buy them an Apple® IIc Personal Computer of their very own.

The IIc is just like the leading computer in education, the Apple IIe. Only smaller. About the size of a three-ring notebook, to be exact.

Of course, since the IIc is the

legitimate offspring of the IIe, it can access the world's largest library of educational software. Everything from Sticky-bear Shapes™ for preschoolers to SAT test

which you might be interested in yourself.

For example, 3-in-1 integrated business software. Home accounting and tax programs. Diet and fitness programs.



With a IIc your kid can do something constructive after school. Like learn to write stories or learn to fly. Or even learn something slightly more advanced. Like multivariable calculus.

preparation programs for college hopefuls.

In fact, the IIc can run over 10,000 programs in all. More than a few of

Not to mention fun programs for the whole family. Like "Genetic Mapping" and "Enzyme Kinetics."



# Give an Apple after school.

And the Apple IIc comes complete with most everything you need to start computing in one box.

Including a free 4-diskette course to teach you how—when your kids get tired of your questions.

As well as a long list of built-in features that would add about \$800 to the cost of a smaller-minded computer.

128K of internal memory—twice the power of the average office computer.

A built-in half-high 140K disk drive

that could drive up the price of a less senior machine considerably.

And built-in electronics for adding accessories like a printer, a modem, an AppleMouse or an extra disk drive when the time comes.

So while your children's shoe sizes

and appetites continue to grow at an alarming rate, there's one thing you

know can keep up with them. Their Apple IIc.

To learn more about it, visit any authorized Apple dealer. Or talk to your own computer experts.

As soon as they get



*In its optional carrying case, the IIc can even run away from home.*

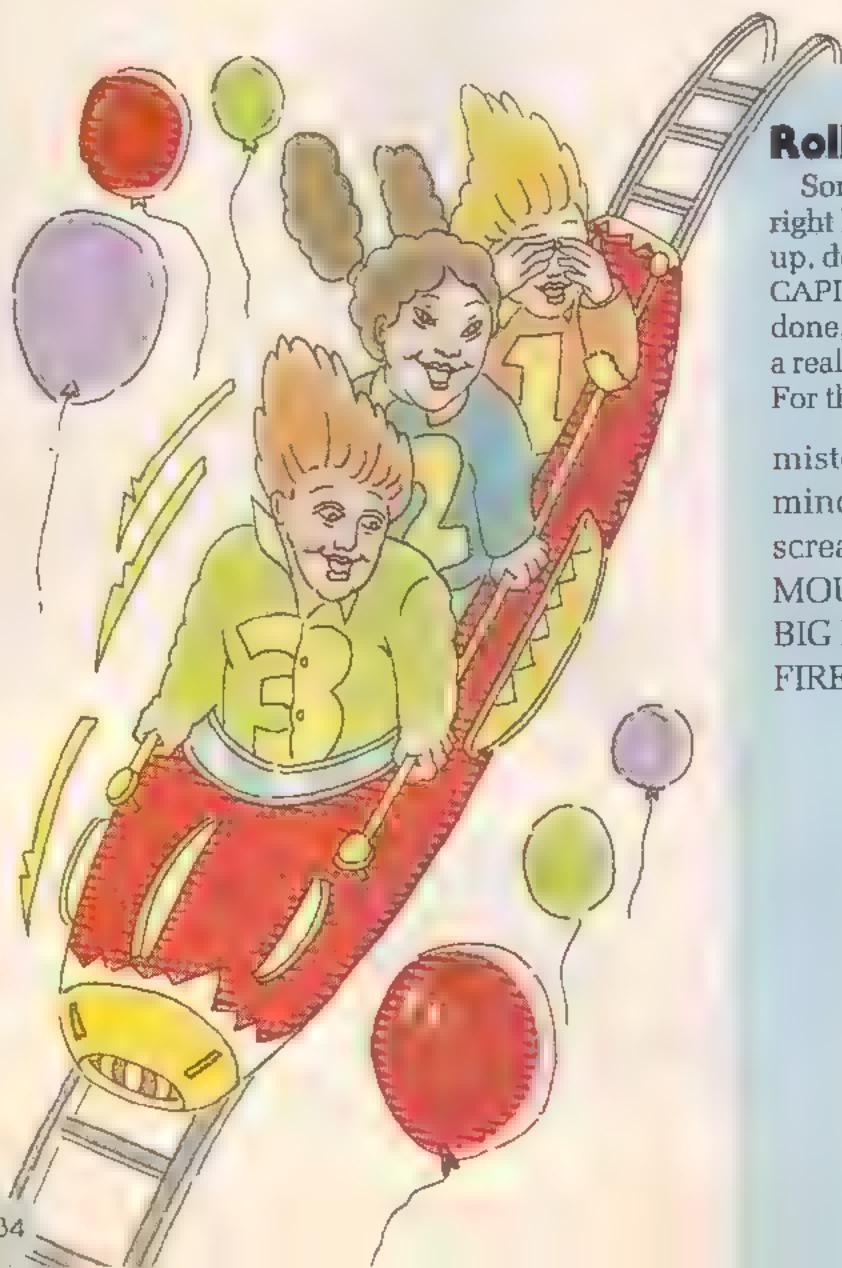
# Extra!

Are you tired of exercising this vacation? Then try EXTRA-exercising! Just read on...

## Kitchen Chicken

Bellina the chicken, Dorothy's best friend in Oz, may be the newest star to hit Hollywood, but here's an old trick that you'll really cluck over. Soak a chicken wishbone in vinegar for a day in a jar. Then spill out the old vinegar. Fill the jar with fresh vinegar and soak for one more day. The bone becomes like rubber. Twist it. Turn it. It shouldn't break!

Why? Calcium makes bones hard. The vinegar breaks down the calcium so the bone is easy to bend.



## Roller Riot

Some of the best roller coasters can be found right here in EXTRA! The names go across, up, down and diagonally. Find the words in CAPITAL letters. Circle them. When you're done, the leftover letters will spell the name of a real "death-defying" machine for daredevils. For the answer, check out the Did It! page.

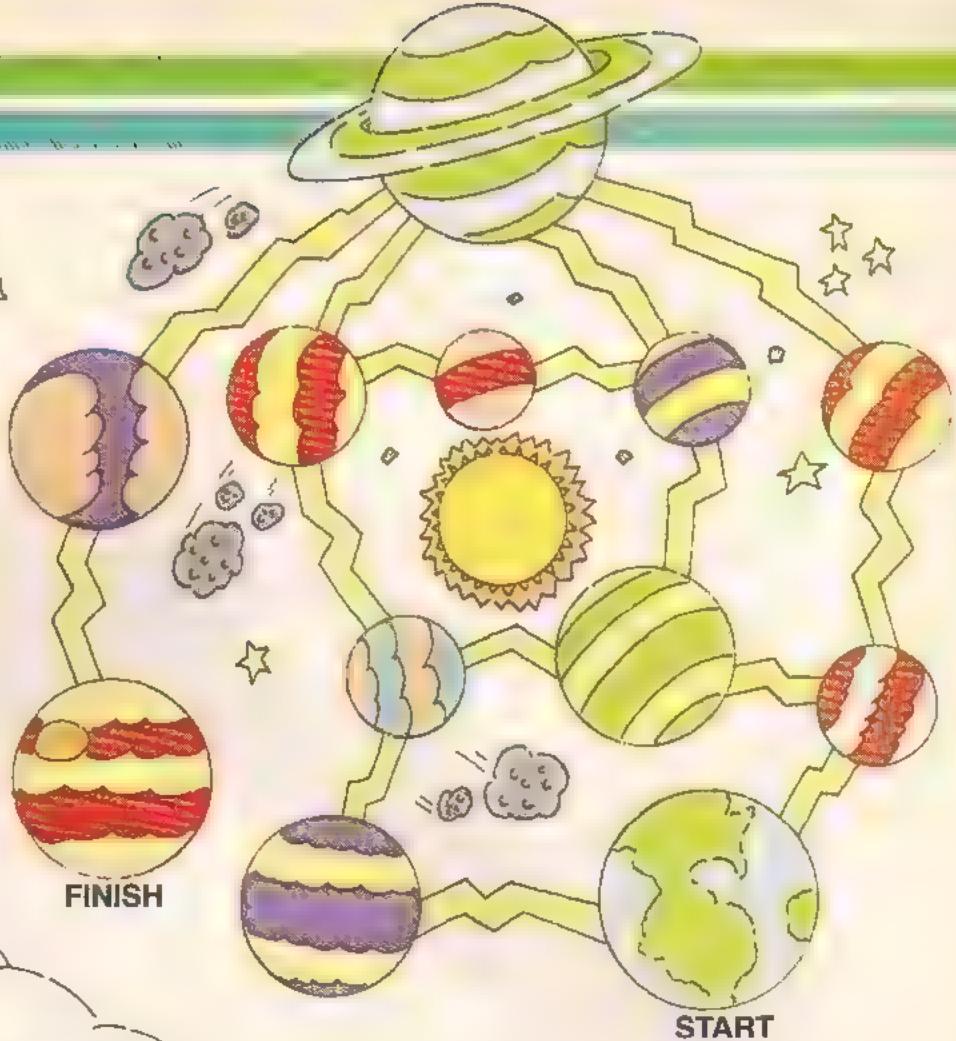
mister TWISTER  
mind BENDER  
screamin' DEMON  
MOUSETRAP  
BIG BAD WOLF  
FIRE DRAGON

CYCLONE  
dragon MOUNTAIN  
AMERICAN eagle  
king COBRA  
the BEAST  
the tidal WAVE

B	E	N	D	E	R	G	N	R	M
I	W	A	V	E	E	A	I	T	O
G	A	M	E	T	M	R	A	E	U
B	I	B	A	W	C	O	T	N	S
A	M	E	R	I	C	A	N	O	E
D	A	A	B	S	N	S	U	L	T
W	C	S	O	T	R	E	O	C	R
O	A	T	C	E	M	M	M	Y	A
L	A	C	H	R	I	N	E	C	P
F	I	R	E	D	R	A	G	O	N

## Planet Panic

Summer is the perfect time to gaze up at the night sky. Follow the orbits of these planets. Draw a line along the paths so that you get from start to finish. Careful! You can only pass through each planet once and you may not cross over your own line. **Answer on the Did It! page.**



## 3-2-1 Contest

ILLUSTRATIONS © M. CHAI DONATO



When Dorothy landed in Oz, she met witches, munchkins, a talking scarecrow and more. But a place like Oz is just a fantasy land. It could live only in your dreams.

Draw a picture of your imaginary land. Tell us what your land looks like. What is it called? Who lives there? We'll choose our favorites. The winners will get CONTACT T-shirts. Send your entries to:

**3-2-1 Contest:**  
**Fantasy Land**  
**P.O. Box 599**  
**Ridgefield, NJ 07657**

# That Sinking Feeling



Can you figure out which objects in this picture would sink and which would float? Right now some of them are mixed up. The answers may surprise you.

Before you float on over to find out what's up on the Did It! page, try the experiment yourself.

# Experiment

## Over the Rainbow

by Joanna Martin

In the movie, *The Wizard of Oz*, Dorothy sang a song called "Somewhere Over the Rainbow." Here are two ways for you to make your own rainbow. You'll be breaking up white light into its seven different colors.

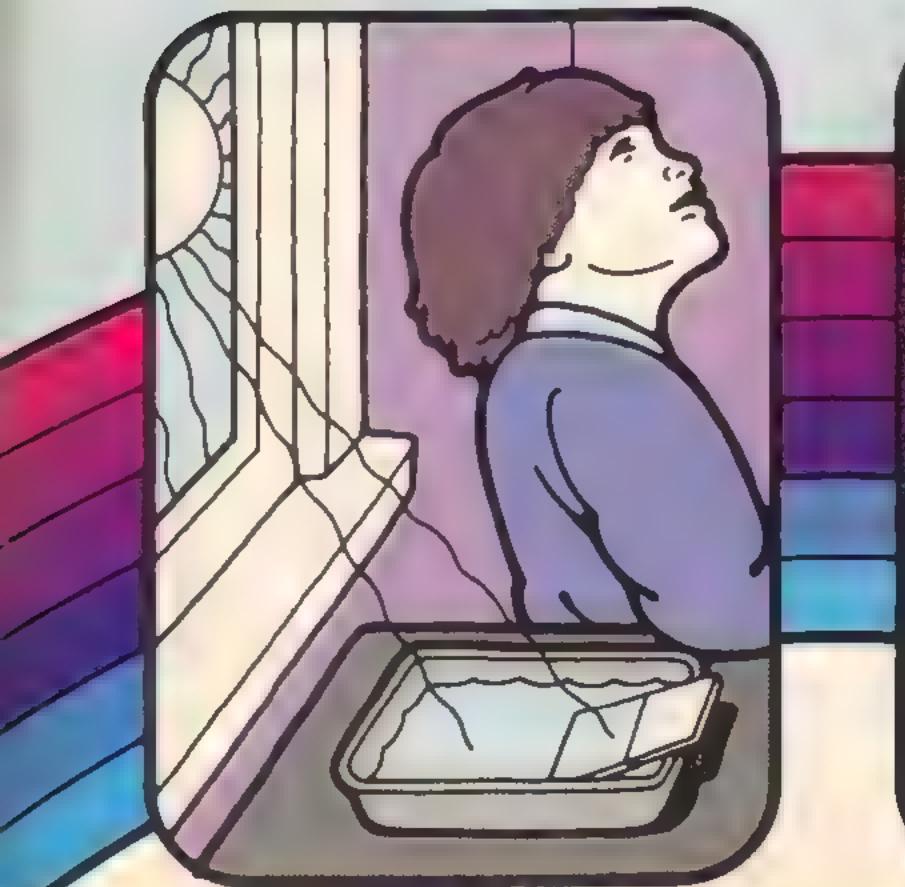
### What You Need

A pocket mirror  
A tray of water A flashlight

Different objects made of glass. You might try jewelry, dishes or glasses. Objects with several different sides are best.

### What You Do

1. On a sunny day, place the tray filled with water so that the light shines into it. Rest the mirror against one side of the tray, as you see in the picture. Make sure the mirror is tilting at an angle facing the sun. If the light hits the mirror just right, you will see a rainbow on the ceiling.



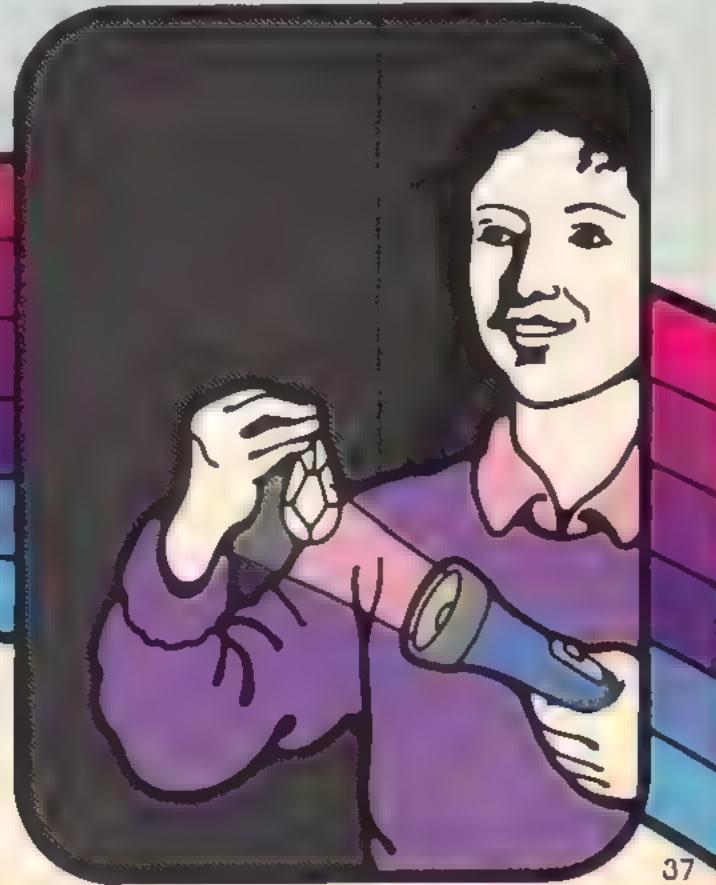
2. In a dark room, hold each glass object you collected up to a flashlight. Turn the pieces of glass around, so that the light hits them from different angles. Rainbows should appear on the walls, ceiling or floor.

### Why It Works

The colors you see in the rainbows you have made are in any beam of white light. When all the colors come into your eyes together, what you see is called white. But if you spread the color out, you can tell one color from another.

When sunlight comes into your room, it is white. Passing through the water in the tray, the colors in the light are spread out. This happens as light passes into the water tray and again as it comes out.

The same thing happens in step #2. This time the white flashlight beam is spread out as it passes through the glass. Again, you are able to see all the colors in the rainbow.



## That Sinking Feeling (page 36)

The crayon, leaf, bottle cap, cork, gum and pencil would float. The sponge, thumbtack, marble and keys would sink.

The crayon, gum, cork and pencil float because they are light. The bottle cap floats because it's shaped just like a boat. Turn it upside down and it will sink. The leaf will float if placed carefully on top of the water because of surface tension—an invisible, skin-like film on the surface of the water.

The keys, marble and thumbtack will sink because they're heavier than water. The sponge will sink when it is filled with water.

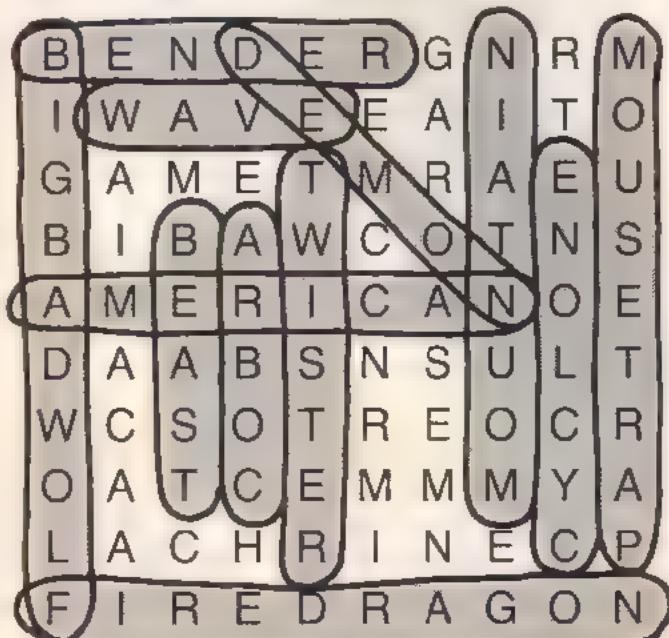
## Contact Comet (page 8)

Path 3 is the correct path to follow.

## Are You a Wizard? (page 30)

1. a; 2. c—The author of the Oz books came upon the name Oz when he looked up at his filing cabinet. It was marked O-Z. 3. b.

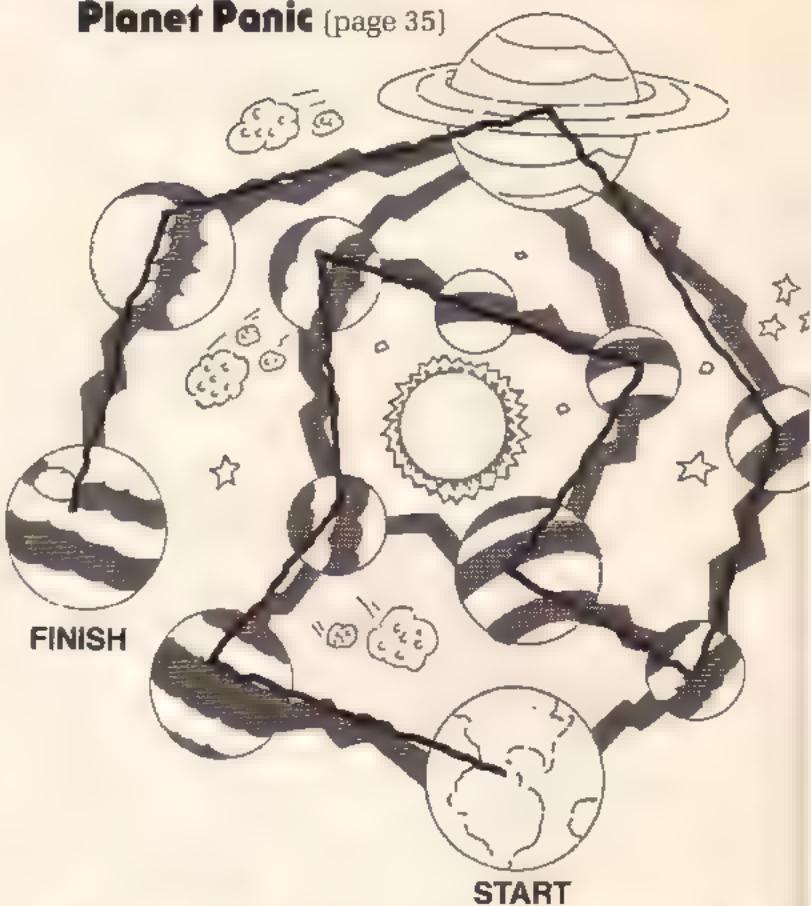
## Roller Riot (page 34)



The answer is:

GREAT AMERICAN SCREAM MACHINE

## Planet Panic (page 35)



## Next Month!

Here's a sample of what you'll find in the next issue of 3-2-1 CONTACT:

### Are UFOs For Real?

Meet some scientists who are investigating UFOs—unidentified flying objects.

### Talking Computers

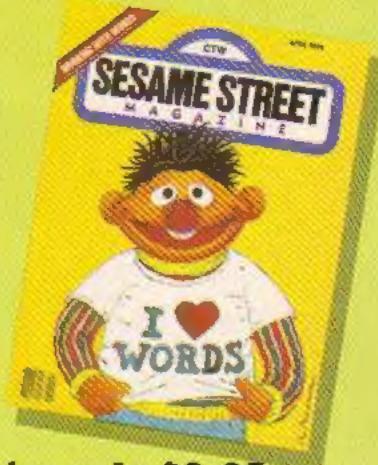
Find out how computers can speak to you with human-like voices. And find out what they are saying!

**Plus Factoids, ENTER Section with Computer Puzzles and Games, Any Questions? and More!**

# LEARNING IS FUN . . .

## Sesame Street Magazine

**B**ig Bird and his delightful friends bring dozens of playful surprises, ten terrific times a year. (It's the entertaining education that Sesame Street does best!) Puzzles, cut-outs, games, A-B-C's, 1-2-3's...there's all the magic of the TV super-series in every colorful issue.



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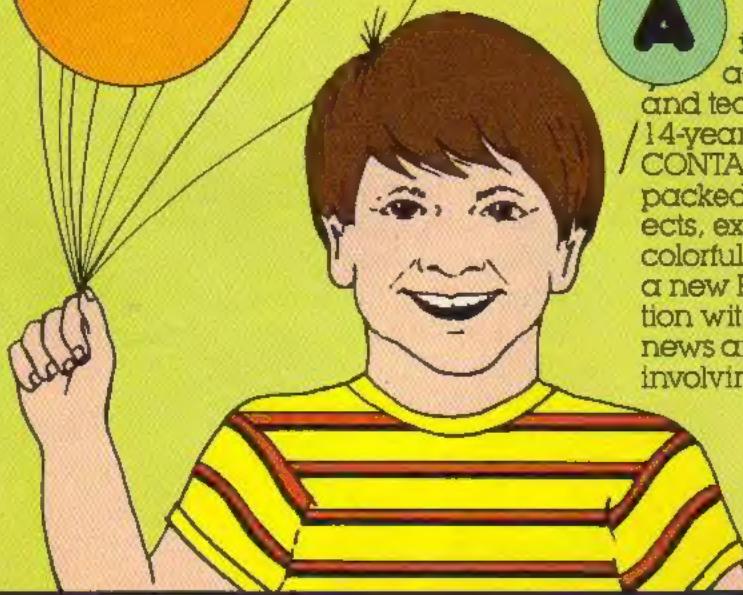
## 3-2-1 Contact

**A**n entertaining, informative adventure in science and technology for 8 to 14-year-olds. Each of CONTACT's ten big issues is packed with puzzles, projects, experiments, and colorful feature stories. PLUS a new ENTER computer section with programming, news and reviews. A fun, involving way to learn!



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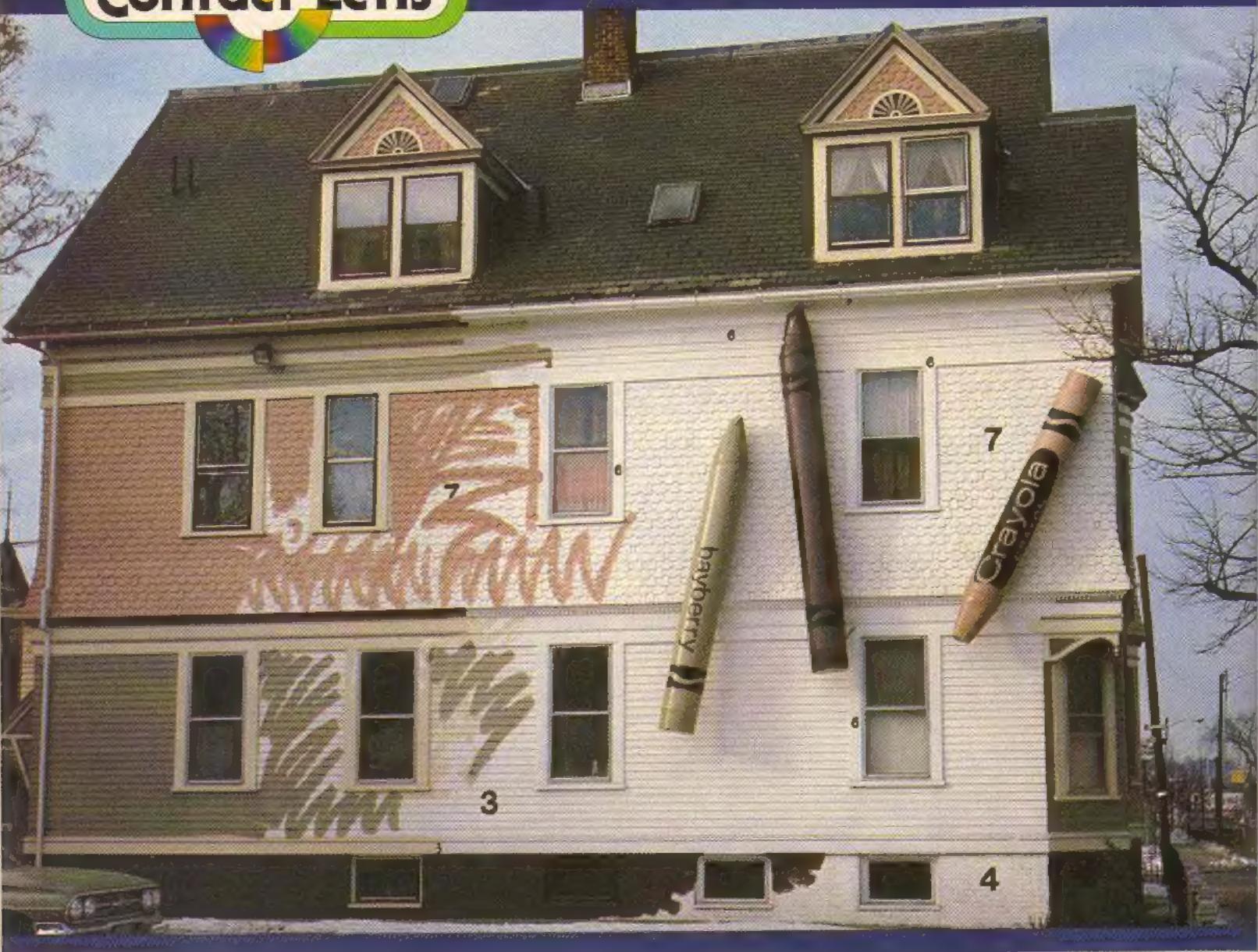


PHOTO © SALVATORE MANCINI

## House of Crayons

You've probably seen an antenna hanging from a roof. But how about giant crayons? That's what you'd see if you walked past this house in Providence, Rhode Island.

The colorful story began one day last winter when the owner of the house decided to paint it. First he tried one color to see how it would look. Not quite right. Then he tried another, and another. Still not quite right. Soon the house began to look like something out of a coloring book. "So we decided to go all the

way!" explains the owner.

With the help of some friends, he decided to create crayons out of strong cardboard. He added a fiberglass tip and end to each one. Then he painted the crayons to look like the real things and hung them from the rooftop. Finally the owner added "coloring book" numbers to the side of the house.

Now when people walk by, they look—and look again. Our only question: What kind of box would they need to keep the crayons in? A verrry big one!

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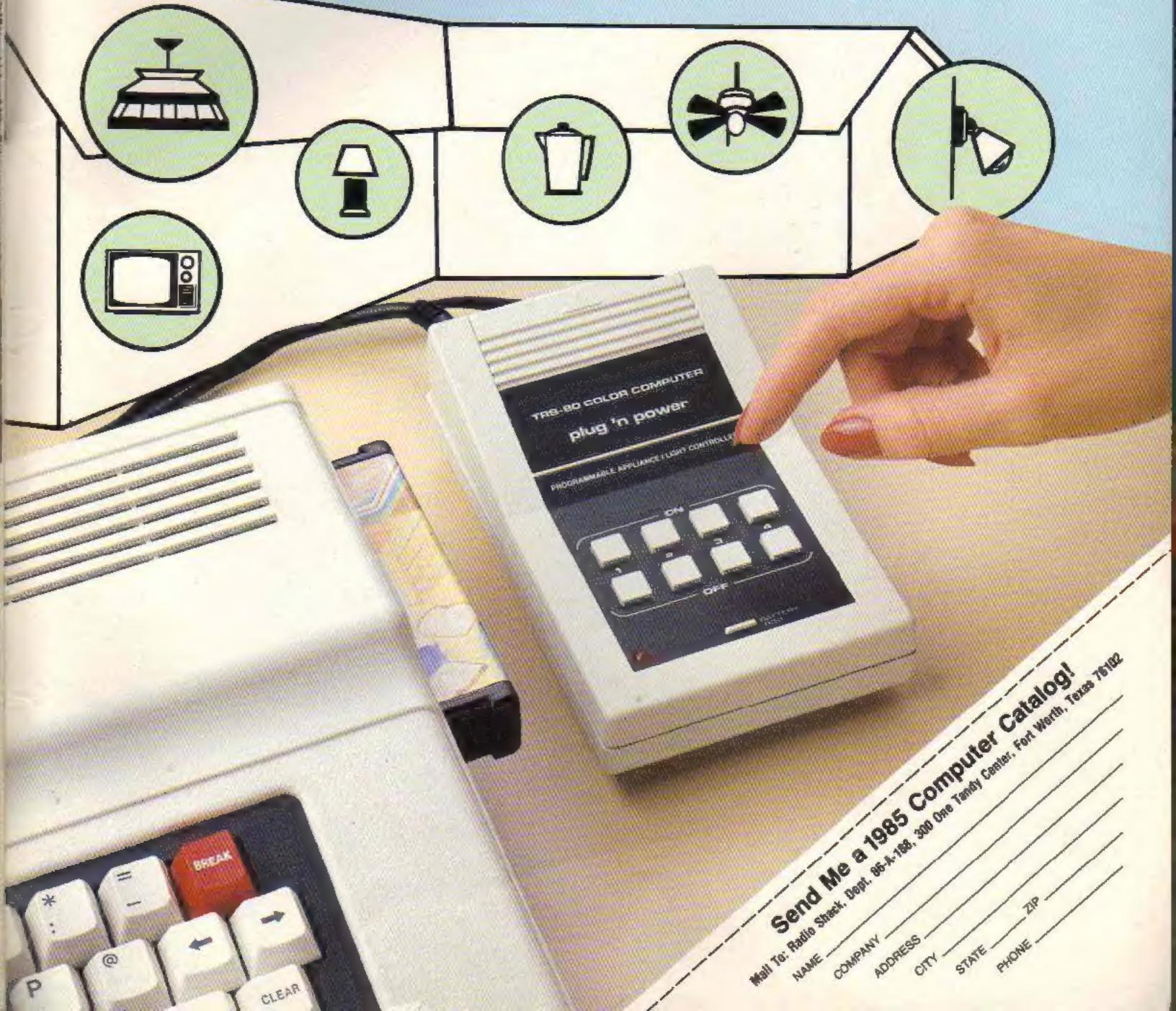
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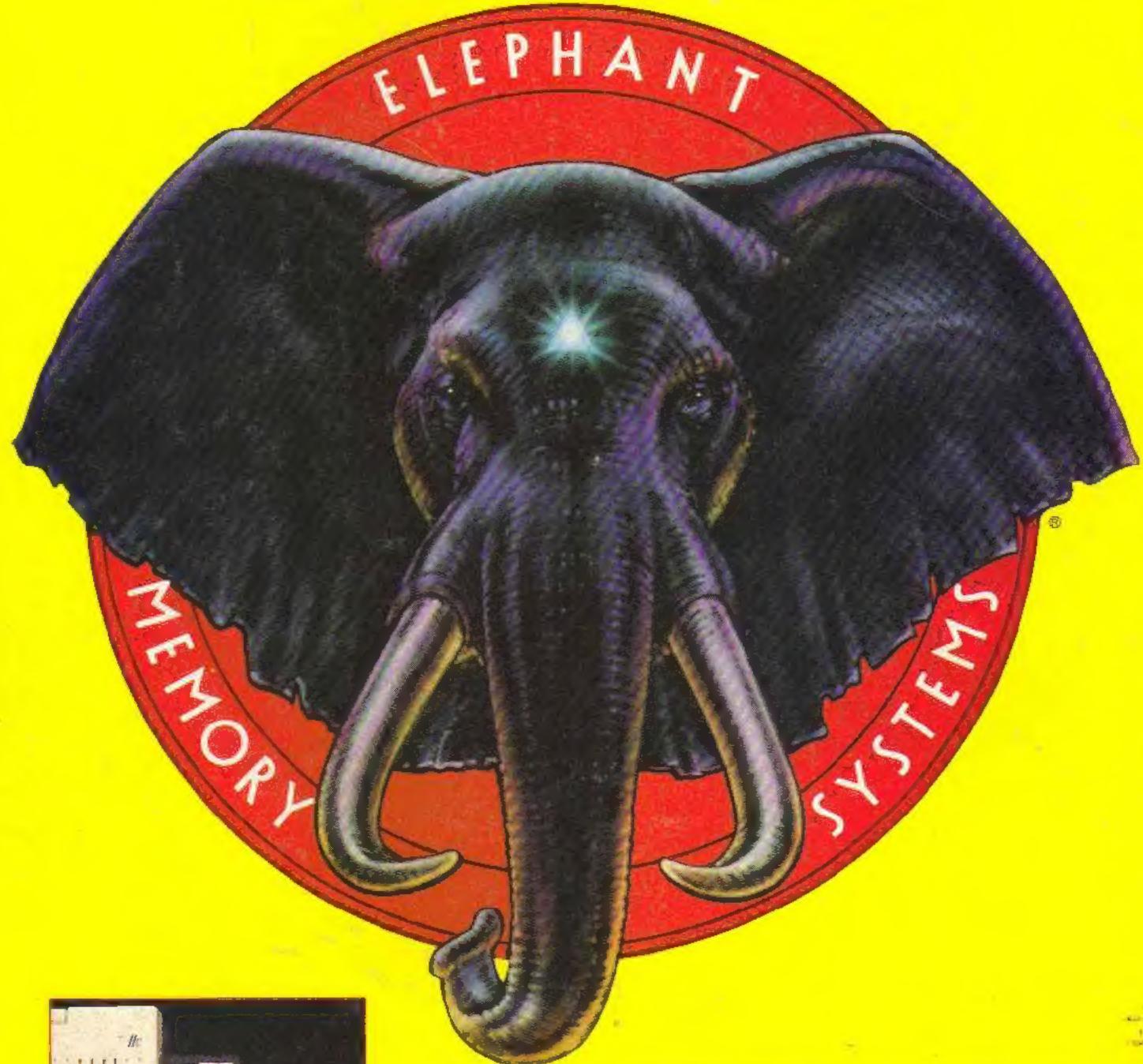
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